

PROCEEDINGS

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J. S. WADE

PUBLICATION NOTE

By a change in the By-Laws of the Biological Society of Washington, effective March 27, 1926, the fiscal year now begins in May, and the officers will henceforth hold office from May to May. This, however, will make no change in the volumes of the Proceedings, which will continue to coincide with the calendar year. In order to furnish desired information, the title page of the current volume and the list of newly elected officers and committees will hereafter be published soon after the annual election in May.

All correspondence should be addressed to the Biological Society of Washington, % U. S. National Museum, Washington, D. C.

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(ELECTED MARCH 26, 1957)

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(ii) *Proceedings of the Biological Society of Washington*

The Status of <i>Fontaria coriacea</i> Koch and of <i>Polydesmus corrugatus</i> Wood: a most regrettable tangle of names in the Diplopoda (Polydesmida: Xystodesmidae), by Richard L. Hoffman	183-188
An Innominate Laughing-thrush (<i>Garrulax</i>) of Northwestern Yunnan, by H. G. Deignan	189-192
A Necessary Correction in the Nomenclature of Waterstriders (Hemiptera), by Carl J. Drake	193-194
New Species and records of <i>Strigiphilus</i> (Phloptoridae: Mallophaga) from Thailand, by K. C. Emerson and Robert E. Elbel	195-200
The Mud Turtle, <i>Kinosternon flavescens stejnegeri</i> Hartweg, in the United States, by Philip W. Smith and M. Max Hensley ---	201-204
<i>Floridobolus</i> , a New Milliped Genus (Spirobolidae), by Nell B. Causey	205-208
A New Species of <i>Eleutherodactylus</i> (Amphibia: Leptodactylidae) from Cuba, by Albert Schwartz	209-212
A New Subspecies of the Eastern Pipistrelle from Florida, by Wayne H. Davis	213-216

PLATES

- Plate I, page 8. *Cinara gentneri*, *C. schuhi*, *C. moketa*, *C. kiusa*.
- Plate II, page 15. *Cinara chinookia*, *C. rustica*, *Schizolachnus curvispinosus*, *Cinara curtihirsuta*.
- Plate III, page 16. *Cinara sonata*, *C. abieticola*, *C. setulosa*.
- Plate IV, page 22. Andean Chilopods.
- Plate V, page 23. Andean Chilopods.
- Plate VI, page 27. Andean Chilopods.
- Plate VII, page 28. Andean Chilopods.
- Plate VIII, page 63. Spiroboloid Millipeds.
- Plate IX, page 72. *Essigella pineti*, *E. agilis*, *E. pergandei*.
- Plate X, page 74. *Esigella essigi*, *E. wilsoni*, *E. swaini*, *E. braggi*.
- Plate XI, page 76. *Essigella californica*, *E. gillettei*, *E. pini*.
- Plate XII, page 80. *Essigella patchae*, *E. robusta*, *E. claremontiana*, *E. maculata*.
- Plate XIII, page 83. *Essigella knowltoni*, *E. palmerae*, *E. monelli*, *E. cocheta*.
- Plate XIV, page 86. *Essigella fusca*, *E. hoerneri*.
- Plate XV, page 200. *Strigiphilus*. Species.
- Plate XVI, page 207. *Floridobolus penneri*.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS

The two meetings during 1957 were held in Room 43 of the United States National Museum.

1023d Meeting — March 26, 1957

SEVENTY-EIGHTH ANNUAL MEETING

President Friedmann in the chair; 26 persons present.

New members elected: Ardon H. Brame, Jr., Bernard R. Feinstein, Robert S. Simmons, Charles J. Stine.

The reports of the Recording Secretary, Corresponding Secretary, Treasurer, and Committee on Communications were presented.

The following officers and members of council were elected: President, Herbert Friedmann; Vice Presidents, H. B. Owens, D. H. Johnson, A. C. Smith, Allen J. Duvall; Recording Secretary, S. F. Blake; Corresponding Secretary, J. L. Paradiso; Treasurer, B. R. Feinstein; Members of Council, M. K. Brady, C. O. Handley, Jr., J. P. E. Morrison, Louis M. Russell, Viola S. Schanz.

The business meeting was followed by an illustrated talk by A. C. Smith, The Bredin-Smithsonian Caribbean Expedition.

1024th Meeting — November 25, 1957

President Friedmann in the chair; 26 persons present.

New members elected: Thomas E. Bowman, Charles E. Cutress, Wayne H. Davis, Robert J. Drake, James S. Harvel, Ernest A. Lachner, Tom McIntyre, Robert L. Packard, William J. Schaldach.

Elected to Emeritus Membership: Albert W. Herre, Colin C. Sanborn, Harry B. Weiss.

Several changes in the By-Laws were adopted.

Formal Communication: Laurence Irving, Biologist, Arctic Health Research Center, Anchorage, Alaska: Adaptation of warm-blooded animals to arctic cold.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW SPECIES OF CONIFER FEEDING APHIDS

By F. C. HOTTES

The conifer Aphids described herewith were taken in the Pacific Northwest. Two of the new species are named after their collectors, Dr. Louis G. Gentner, and Mr. Joe Schuh, both of Oregon, in appreciation of their efforts in adding to the Aphid fauna of their state.

Cinara gentneri n. sp.

Apterous viviparous female.

Length and general color.—Length from vertex to end of anal plate of cleared specimens varying from 5.55-5.77 mm. Color probably quite similar to color of oviparous female, recorded, by Dr. Gentner as light yellowish-brown.

Head and thorax.—Length of antennal segments as follows: III .825-.975mm., IV .45-.53mm., V .555-.63mm., VI .27-.30 + .09mm. Third antennal segment without sensoria, sensoria on fourth segment variable, sometimes with only primary, which is normal in size and position, sometimes without primary and with 1-3 small secondary sensoria, sometimes with only one large sensorium, but this removed from the end of segment. Fifth antennal segment with narrow rimmed, large primary sensorium, and one comparatively large secondary sensorium. Primary sensorium on sixth antennal segment tuberculate, marginal sensoria on this segment arranged in an irregular row, and as a rule six in number. Hair on antennae numerous, almost upstanding, fine, sharp pointed, on third segment varying from .07-.09mm. in length, slightly longer than width of segment, the ratio of length to width of segment being 6-5. Hairs on sixth antennal segment longer than width of segment, rather droopy, extending to base of primary sensorium. Second antennal segment with numerous hairs, the hairs covering all of the surface, hair on first antennal segment limited to apical half of segment, more numerous than usual. Median transverse suture variable, as a rule absent, at times represented by an extremely short line, only rarely is it complete, and when so very indistinct.

Rostrum when extended reaching to or slightly beyond genital plate, in one case exceeding length of body. Last three segments of the rostrum with following lengths: .42, .38 and .10mm. Compound eyes small, round, ocular tubercles present, but so small that they have to be looked for. Median mesosternal tubercle absent. Length of prothoracic femora varying from 1.50-1.65mm. Length of metathoracic femora varying from 1.84-2.17mm. Length of metathoracic tibiae vary-

ing from 2.82-3.07mm. Length of first and second metathoracic tarsal segments .15 and .45mm. Hair on metathoracic tibiae numerous, fine, tapering to a long fine point, more numerous on inner margin but not so long or upstanding, as on the outer margin where they are about .10mm. in length. On the outer margin the hairs are set at an angle of more than sixty degrees near middle and basal regions of segment, and slightly less towards the apex. Ventral surface of first tarsal segment with about fourteen hairs. Hairs on ventral surface of second tarsal segment more numerous and shorter than those on dorsal surface. Union of first and second tarsal segments about equal to width of second segment, or to length of dorsal surface of first tarsal segment.

Abdomen.—Dorsal and ventral surfaces of abdomen with numerous hairs, which are similar on both surfaces as to length and coarseness. These hairs are similar to those found on the cornicles. Dorsum of abdomen without pigment spots, except for the two transverse spots anterior to the cauda which have from two to three rows of coarse hairs on their posterior margins. These spots are provided with very poorly developed setulae. Directly anterior to the transverse pigmented spots the abdomen is almost free from hairs, but the region between them has several hairs similar to the hairs found on them.

These hairs are much coarser than those on the dorsum of the body. Dorsum of abdomen with about four rows of very small wax pore plates. Cornicles with outer margin very irregular, often with small clear areas. Anterior portion of cornicles extended forward, giving them a longer axis than their width, this anterior projection of the cornicle is very irregular, and has several clear areas. Hairs on cornicles of one kind, about .15mm. in length, on outer margin where the hairs are fewer, the hairs are more numerous and slightly shorter on cone. Genital plate very large, unusually deep, with a narrow notch located in the median region of the anterior and posterior surfaces. Median posterior region of genital plate free from hairs. Hairs on lateral regions very coarse, much longer than hairs located in median region. Surface of genital plate indistinctly covered with setulae. Cauda and anal plate provided with numerous long coarse hairs.

Oviparous female.

Dr. Gentner sent me living specimens. They arrived dead but nevertheless in a life like condition, so that color notes could be made. Head thorax and abdomen dusky dark brown. Pits on pro and mesothoracic segments slightly pruinose. Anterior and posterior margins of prothorax yellowish. Abdomen dusky dark-brown. Cornicles brown, but much darker than abdomen. Antennae and legs brown, with the ends of segments dusky.

Size and lengths of antennal segments, and legs within range of similar structures of the apterous viviparous female. Hind tibiae with almost no swelling, most unusual in the presence of only a meager number of sensoria, which are widely scattered, small, non tuberculate, and three to six in number. Other structures as in apterous viviparous female.

Holotype, apterous viviparous female. Morphotype, oviparous female. Both deposited in the United States National Museum. Host, *Abies grandis*. Union Creek, Jackson Co., Oregon. Holotype taken Sept. 21,

1956. Morphotype taken Oct. 15, 1956. Collected by Louis G. Gentner.

Specimens of this species key, in Palmer's key to the genus *Cinara*, in "Aphids of the Rocky Mountain Region" to *Cinara curvipes* (P), a species from which it differs in almost all respects except those made use of in the key. To enumerate, the unguis is nail-like, the color is brown not black, the hairs on the antennae, legs, and cornicles differ, none of the hairs are ever dull at the apex, those on the tibiae are upstanding, the antennae are not imbricated, the cornicles have many more hairs, the hind tibiae are not so bent, the antennae have many more hairs. This species may be differentiated at once from *C. kiusa* to which it is closely allied by the very large, and deep genital plate.

Cinara kiusa n. sp.

Apterous viviparous female.

Length from vertex to end of anal plate of cleared specimens varying from 3.25-3.67mm. Color in life not recorded. Head and thorax dusky brown. Abdomen free from pigmented spots. Cornicles dusky brown. First antennal segment concolorous with head. Second antennal segment slightly lighter in color than first segment. Remaining antennal segments pale dusky with apical portions of segments brownish. Color of all femora much the same, medium dusky brown, with the extreme apex, almost black. Basal portion of tibiae deep brown, followed by dusky brown, which becomes deeper brown beyond middle, and continues thus to apex. Tarsal segments brown shaded with black.

Head and thorax.—Antennal segments with the following lengths; III .825-915mm., IV .42-535mm., V .525-.575mm., VI .24-.25 + .09mm. Third antennal segment without sensoria, fourth segment with only primary sensorium, fifth segments with one secondary sensorium and primary. Hair on antennae numerous, upstanding, on third segment, varying from slightly less than width of segment to equal to width, or about .10mm. Hair on sixth segment more numerous than usual, extending to mid region of primary sensorium, almost straight. Unguis distinctly nail-like. Second antennal segment with numerous hairs, hair on first segment confined to apical half. Median transverse suture indistinct, narrow, rather pale in color. Hairs on vertex and dorsum of head numerous, fine, about .11mm. long. Eyes comparatively small, ocular tubercles small, difficult to differentiate. Rostrum when extended reaching slightly beyond the cornicles. Last three segments of the rostrum measuring .42, .40, and .15mm. Length of prothoracic femora varying from 1.42-1.65mm. Metathoracic femora varying from 1.95-1.975mm. Metathoracic tibiae varying from 3.18-3.30mm. Length of metathoracic tarsal segments .15 and .43mm. Hair on femora numerous, fine, upstanding, distributed over entire surface, about .045mm. in length on metathoracic femora. Hair on tibiae fine, sharp-pointed, numerous, much shorter than width of segment, varying in length from .05-0.75mm. in length. The hair on the outer margin are slightly longer, and more upstanding, than the hair on the inner margin. The hairs near the apex of the tibiae are more numerous, and less upstanding than the hairs closer to the base. Hairs on ventral surface of the first tarsal segment very difficult to count, probably about twenty. Hairs on ventral surface of the second segment more numerous, and

shorter than the hairs on the dorsal surface. Mesosternal tubercle absent.

Abdomen.—Hairs on dorsal and ventral surface of the abdomen similar, the hairs are numerous on both surfaces, and similar to the hairs on the cornicles. Lateral dorsal surface of abdomen with two rows of small wax pore plates. Transverse pigmented areas anterior to cauda with very irregular inner margins, surface covered with short fine setulae, arranged in transverse rows. Posterior margin of pigmented areas with two to three rows of long coarse hairs, similar hairs are located between the pigmented areas. Cornicles with width through outer margin varying from 3.25-.375mm. Outer margin quite regular, except for a very slight forward extension. Genital plate narrow, broadly excavated posteriorly, free from hairs except for lateral portions. Setulae well developed. Cauda and anal plate with numerous hairs, both structures with well developed setulae.

This species is closely allied to *Cinara gentneri* differing in smaller size, color of legs and antennae, cornicles with fewer rows of hairs, forward extension of cornicles less and different lengths of antennal segments. The two species may be differentiated at once by observing the genital plates. The genital plate of *gentneri* is very deep, is indented on both the anterior and posterior margins, and has many more hairs. The genital plate of *kiusa* is narrow, has the hairs limited to the lateral posterior portions of the plate.

Holotype, apterous viviparous female, deposited in the United States National Museum. Host, *Abies Concolor*. Coll. M. J. Buckhorn, August 15, 1930.

Cinara schuhi n. sp.

Alate viviparous female.

Length from vertex to end of anal plate varying from 2.10-3.25mm. Color in life not recorded, remembered by Mr. Schuh as, "light brown." Color of cleared specimens as follows: Antennal segments brown, quite uniform in color, except for the extreme base of the third segment which is pale. Head and thorax dark brown. All femora with basal area pale, remainder deep brown. Pro and metathoracic tibiae uniform brownish black, or almost so, mesothoracic tibiae not quite so dark, dusky brown with ends of segment darker. Tarsal segments concolorous with ends of tibiae. Cornicles brown. Dorsum of abdomen free from pigmented spots, except for transverse pigmented areas anterior to cauda.

Head and thorax.—Length of antennal segments as follows: III .22-.24mm., IV .255-.285mm., VI .13-.15 + .03-.05mm. Sensoria distributed as follows: III eight-ten plus primary. The secondary sensoria are very large, and arranged in a straight row, all sensoria on this segment have wide rims. IV one-three secondary sensoria, plus primary, the secondary sensoria are arranged in a straight row, have wide rims, but are not as large as those on the third segment. V one secondary sensorium plus primary. Fourth, fifth and sixth antennal segments lightly imbricated, the imbrications being best developed on the sixth. Antennal hair moderately numerous, fine, sharp-pointed, about .08mm. in length, longer than width of segment, the ratio of length to width

being 5-3. The hairs are more numerous on the anterior margin, than on posterior margin, and are set at an angle of forty-five degrees or more, no hairs upstanding. Hairs on sixth segment extending to primary sensorium. Marginal sensoria close to primary sensorium, more or less in a row. Second antennal segment with ends free from hairs, the hairs on this segment being limited to the mid region. First antennal segment with few hairs, the hairs being in one or two rows beyond middle. Rostrum extending to cornicles, last three segments with the following lengths: .19, .15, .08mm. Median transverse suture narrow, dark. Hairs on anterior margin of head about .08mm. in length. Eyes small, round, ocular tubercles difficult to differentiate. Media twice forked, second fork closer to margin than to first fork. Lateral lobes of thorax with hairs covering all but extreme lateral portions. Median posterior lobe of thorax with few hairs. Metathoracic femora varying in length from 1.52-1.77mm. provided with fine sharp-pointed hairs, which are slightly more numerous on the anterior margin than on the posterior margin, also slightly longer, being about .09mm. in length. Metathoracic tibiae varying from 2.55-3.07mm. Hairs on tibiae numerous, fine, sharp-pointed, set at an angle of about forty-five degrees, or less, varying in length from .105-.11mm. longer than width of segment, the ratio of length to width being 7-6 or 8-6. Hair on inner margin of hind tibiae slightly shorter than hair on outer, also more numerous. First tarsal segment with about 18 hairs on ventral surface, the union of this segment with the second segment is no wider than the width of the second segment. Hair on dorsal surface of second tarsal segment, longer and fewer than the hairs on the ventral surface. Length of first metatarsal segment .13mm. length of second tarsal segment .30mm.

Abdomen.—Hairs on ventral surface of abdomen much more numerous than the hairs on dorsum, only one half as long. Hairs on dorsum of abdomen fine, about .10mm. in length. Dorsum of abdomen with exceedingly short and fine setulae. The setulae are arranged in transverse rows, the rows are very close together. Cornicles with outer margins quite regular in outline, width of cornicles varying from .30-.35mm. Hairs on cornicles covering entire surface, similar to those on dorsum of abdomen. Transverse pigmented spots anterior to cauda very narrow, far apart, provided with two rows of hairs on posterior margin. Cauda and anal plate with setulae. Hair on cauda for most part limited to posterior margin. Genital plate slightly excavated posteriorly, provided with few hairs, confined largely to ends.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.55-2.85mm. Color most likely brown. Legs and antennae not quite so dark as in the alate. Length of antennal segments as follows: III .48-.50mm., IV .20-.21mm., V .225-.27mm., VI .12-.13 + .04. Sensoria distributed as follows: III 1-5 plus primary, IV 1 secondary plus primary, V similar to fourth. The secondary sensoria are large, round, with wide rims, and on the third segment confined to apical portion of segment. Primary sensoria large, with wire rims. Hairs on antennae similar to those on antennae of alate, but slightly longer. Sixth antennal segment weakly imbricated. Median transverse suture distinctly brown. Ocular tubercles small. Mesosternal tubercle small. Metathoracic femora vary-

ing in length from 1.275-1.50mm. Metathoracic tibiae varying in length from 2.25-2.40mm. Metatarsal segments .105 and .225mm. Hairs on metathoracic tibiae varying from .09-1.05mm. in length on outer margin, slightly less on inner margin, numerous on both surfaces.

Cornicles varying from .30-.375mm. Outer margin of cornicles uneven. Hairs on cornicles on entire surface, similar to the hairs on the dorsum. Hairs on dorsum of abdomen, much more numerous than the hairs on the dorsum of the abdomen in the alate, about .105mm. in length. Hairs on ventral surface of the abdomen very numerous. Transverse pigmented spots anterior to cauda very narrow provided with an irregular row of long hairs on the posterior margin. Hairs on cauda confined largely to posterior margin. Holotype, alate viviparous female, Morphotype apterous viviparous female. Both mounted on the same slide, which has been deposited in the United States National Museum. Host *Abies concolor*. August 12, 1956, Bly, Oregon. Coll. Joe Schuh.

This species keys to couplet 29 in Palmer's key to the genus *Cinara*, in Aphids of the Rocky Mountain Region. The fourth segment of the rostrum is not longer than .25mm. but hind tarsal two is more than .28mm. The species is not *C. murrayanae*. The sensoria on third antennal segment suggest *C. curtihiirsuta* H & E but the hairs on the antennae and tibiae are too long, and much too numerous. The hairs on the dorsum of the abdomen are too long, and there are more numerous hairs on the cornicles.

***Cinara moketa* n. sp.**

Apterous viviparous female.

Length from vertex to end of anal plate 3.60mm. Color in life not recorded. Cleared specimens with head, pro and mesothorax very dark dusky brown. Anterior portion of metathorax with four mid dorsal patches of brown, which are in turn surrounded by small irregular shaped dusky spots. Mid dorsal region of abdomen posterior to cornicles with four irregular shaped spots of brown. Lateral regions of dorsum of abdomen with two rows of small wax pore plates. Transverse pigmented spots anterior to cauda with ends irregular, far apart. First two antennal segments concolorous with head, third and fourth antennal segments pale with ends brown, sixth segment uniform brown. Femora with basal portions pale, shading to brown at the apex. Pro and mesothoracic tibiae with short distance near base brown, this is followed by a yellowish region which shades gradually to brown at the apex. Metathoracic tibiae with brown at apex more extensive, and the pale region much shorter. Tarsal segments concolorous with ends of tibiae. Cornicles brown. Cauda and anal plate brown with outer margins almost black.

Head and thorax.—Width of head through the eyes .75mm. Hairs on anterior margin of head .11mm. in length. Antennal segments with the following lengths: III .45mm., IV .16mm., V .23mm., VI .10 + .04mm. Third and fourth antennal segments with only primary sensoria. Fifth antennal segment with one secondary and primary sensoria. Sixth antennal segment and a portion of the fifth weakly imbricated. Hair on antennae fairly numerous, those on anterior margin more numerous

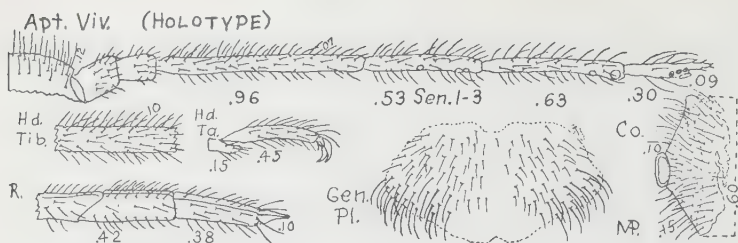
than those on posterior margin, about .10-.12mm. in length. Eyes large with well developed ocular tubercles. Both margins of femora with numerous long fine sharp pointed hairs. Length of prothoracic femora .84mm. Length of mesothoracic femora .755mm. Length of metathoracic femora 1.305mm. Lengths of pro, meso and metathoracic tibiae 1.245, 1.425, and 2.25mm. Hairs on metathoracic tibiae numerous, hairs on basal third almost upstanding, remaining hairs about sixty degrees at middle of segment to about forty-five degrees near apex. Hairs on outer margin longer and slightly more coarse than the hairs on the inner margin, also slightly more numerous. Hairs on outer margin not all of the same length, the distinctly shorter hairs are slightly more droopy than the long hairs, the two lengths of hair are intermixed. Length of first metatarsal segment .13mm. ventral surface of this segment with about twelve hairs. Length of second metatarsal segment .27mm. hairs on ventral surface of this segment shorter than those on the dorsal surface, where the hairs are slightly less than two times the width of the segment in length. Union of first and second tarsal segments not wider than width of second segment at point of union. Mesosternal tubercle absent.

Abdomen.—Hairs on dorsum of abdomen distinctly finer and longer and fewer than hairs on ventral surface. Length of hairs on the dorsum .15mm. Length of hairs on the venter .105mm. The hairs on the dorsum arise from small pigmented tubercles. Cornicles with outer margin quite regular. Width of cornicles .48mm. Constricted portion of cornicles with numerous hairs, region near margin with distinctly fewer hairs.

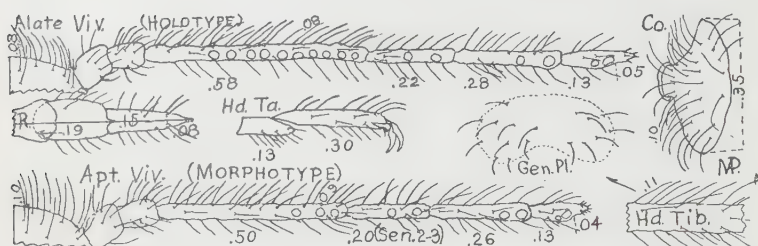
Transverse pigmented spots with two rows of hairs on the posterior margin. Dorsum of abdomen very finely reticulated, but without setulae. Cauda and anal plate with blackish setulae, cauda with median posterior tubercle, not always distinct. Hair on cauda and anal plate confined largely to posterior margin. Genital plate somewhat bent in the form of a crescent with the ends blunt and irregular. Hairs on genital plate confined to ends of crescent.

This species is allied to *C. hirsuta* H & E, and may be quickly differentiated from that species by the absence of the almost square mesosternal tubercle. The antennal segments are shorter, as are the tibiae, and the hair on the tibiae, the hair on the cornicles are not as extensive, and distinctly fewer hairs on the transverse pigmented spots. In Palmer's key to the genus *Cinara* in Aphids of the Rocky Mountain Region this species keys to *C. pinca* (Mord.), but not without difficulty because of couplet 27 which makes no allowance for hairs of two lengths and different angles. This species differs from *pinca* in many ways, the antennae are shorter, as are the tarsal segments, the hair on the tibiae are not of the same quality, and the cornicles are larger.

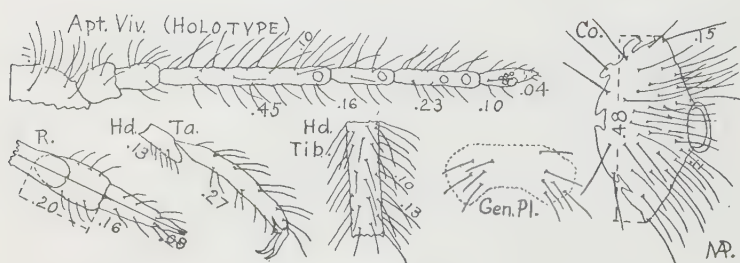
Holotype, apterous viviparous female, deposited in the United States National Museum. Host, *Pinus lambertiana*, Placerville, California March 16, 1939. Coll. J. S. Yuill.



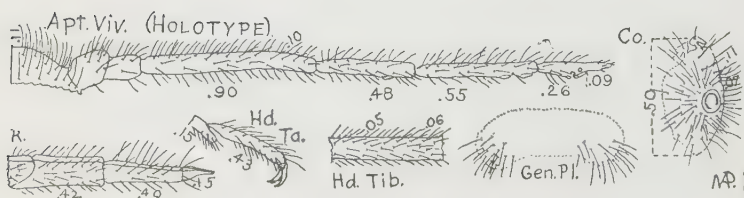
Cinara gentneri n. sp.



Cinara schuhi n. sp.



Cinara moketa n. sp.



Cinara kiusa n. sp.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS AND FIGURES OF THE
MORPHOTYPES OF SOME CONIFER FEEDING
APHIDS

BY F. C. HOTTES

It is a pleasure to acknowledge the assistance of Dr. Louis G. Gentner and Mr. Joe Schuh who collected some of the forms described herewith.

Cinara sonata H.

Alate viviparous female.

Length from vertex to end of anal plate 6.60mm. Color in life not recorded, but cleared specimen is similar to cleared apterous viviparous forms. Length of antennal segments as follows: III 1.10mm., IV .50mm., V .50mm., VI .28 + .05mm. Sensoria distributed as follows: III 4-5 plus primary, confined to end of segment and arranged in a row, IV 1-2 secondary, plus primary, V 2 secondary, plus primary. Hair on third antennal segment fine, upstanding varying from .15-.18mm. in length, and quite numerous. Region of sixth antennal segment beyond middle weakly imbricated. One marginal sensorium much larger than the others and with a distinctly open center. Compound eyes very much rounded, comparatively small, with area next to head, equal to about half of eye free from ommatidia. Ocular tubercles present, but so small that they are apt to be overlooked. Rostrum not extended. Length of pro meso and metathoracic femora as follows: 2.20, 2.02, and 2.775mm. Length of metathoracic tibiae 5.40mm. Length of first metatarsal segment .12mm. Length of second tarsal segment .495mm. Wings poorly mounted, media very faint, twice branched, media 3 and 4 hardly visible. Cornicles with base much longer from the front to rear, than from side to side, longest width of base .90mm. Base of cornicles with numerous long rather coarse hairs, more constricted area of cornicles with finer, and somewhat shorter hair. Inner margin of cornicles with a deep cleft, similar to that which is present in the apterous viviparous female. Waxpore plates small, but the individual facets are very large. Pigmented areas are absent on the dorsum of the abdomen anterior to the cornicles, and almost lacking posterior to them, where present very small, very irregular and without arrangement. Pigmented spots anterior to cauda with from two to three rows of hairs. Other features of the alate similar to those of the apterous viviparous female.

Morphotype alate viviparous female deposited in the United States

National Museum. *Abies grandis*, Kootenai, Idaho July 18, 1949.
Coll. A. L. Gibson.

This form differs from the alate form of *C. abieticola* (Chol.) in having the secondary sensoria confined to the end of the segment on the third segment, in longer antennal segments, in having the genital plate wider and different in shape, in the shape and size of the cornicles, and in having the long hairs on the sixth antennal segment more numerous, and covering a greater extent of the segment.

Alate male.

Length from vertex to end of anal plate 3.375mm. Width of head through the eyes .78mm. Length of antennal segments as follows: III .75mm., IV .36mm., V .33mm., VI .20 + .05mm. Secondary sensoria distributed as follows: III 55, covering most of segment, IV 12, confined for the most part to the posterior surface and irregularly arranged, V, 3 arranged in a row on the posterior surface. Primary sensoria if present on third and fourth segments, like secondary, primary sensorium on fifth antennal segment large and quite tuberculate. Hair on antennae about .18mm. in length, fine, upstanding, much more numerous on anterior margin than on posterior margin. Median transverse suture on head very narrow, and not much darker than the head. Eyes small, round, without ocular tubercles. Media of fore wings with two forks, the second fork closer to the margin of the wing, but far removed from the edge. All femora with fine long hairs, which are rather numerous. Metathoracic femora 1.42mm. in length. Metathoracic tibiae 2.40mm. in length. First metatarsal segment .135mm. long, second metatarsal segment .36mm. in length. Hairs on metathoracic tibiae longer on outer margin than on inner margin, on this surface some hairs are more upstanding than others, these hairs are as a rule longer than the hairs which are not so upstanding. Hairs on dorsum of abdomen more numerous and longer than the hairs on the ventral surface. Ventral surface of abdomen with a distinct pigmented spot anterior to the genital plate, and about the same in size. Pigment spots on the dorsum of the abdomen indistinct. Cornicles longer than wide, length about .375mm. Inner margin of cornicles with a distinct furrow, similar to that found in the apterous and alate viviparous females. Surface of cornicles with numerous fine, long hairs, except for the restricted area where the hairs are much shorter. Anterior to the cauda there are two pigmented spots, these are very narrow, with their more median portions more or less fragmented. Cauda and anal plate with numerous hairs. Harpes rather blunt with moderately long hairs over the apex surface.

Allotype alate male, deposited in the United States National Museum. Collected on *Abies magnifica* var. *shastensis*, Mt. Ashland, Oregon Sept. 27, 1956 by L. G. Gentner.

Apterous oviparous female.

Length from vertex to end of anal plate 4.27mm. distinctly smaller than the viviparous female. Color of mounted specimens similar to that of viviparous females. Length of antennal segments as follows: III .97mm., IV .375mm., V .435mm., VII .225 + .075mm. Length of hind tibiae 3.60mm. provided with numerous small, tuberculate sensoria which cover all of the surface except the extreme base and a short

space near the apex. The hind tibiae are hardly swollen. Other features similar to those found on apterous viviparous female. Morphotype apterous oviparous female, deposited in the United States National Museum. Collected at the same time, and on the same host as the male by L. G. Gentner.

This species is apparently quite common on *Abies* sp. in our North Western States. Specimens of this species are so large that it is common to have immature specimens taken for mature ones. Immature specimens of *C. sonata*, always have the cornicles, smaller, much rounded, and lack the furrow on the inner margin.

Dr. L. G. Gentner to whom I am indebted for the male and oviparous females described herewith has taken it several times in Southern Oregon. He has sent me the following color and habitat notes, which are the first such taken from life known to me.

"Taken by beating the lower branches of Shasta red fir, *Abies magnifica shastensis*. Specimens were observed on the under sides of the lower branchlets among the bases of the needles. Apterous forms rather broadly oval, piceous, with bronze aenescens, very dark gray, dull patches of waxy powder on the pronotum and several narrow, transverse bands of same on dorsum of abdomen; underside covered with somewhat lighter grayish powder; legs pale brownish with dark areas at the joints and towards the middle of the segments giving them a banded appearance, antennae pale brownish with a piceous blotch at each joint."

Cinara setulosa H & E

Alate male.

Length from vertex to end of anal plate approximately 2.155mm. Dr. L. G. Gentner who collected the material from which this form is described recorded the color as follows: "Head and thorax black. Abdomen rather bright green." Antennae dusky except for the extreme base of third segment which is pale. All femora dusky with area at extreme base yellowish. Pro and mesothoracic femora much darker than the metathoracic femora. Tibiae and tarsal segments very dark brownish black, uniform throughout.

Length of antennal segments as follows: III .60mm., IV .23mm., V .22mm., VI .18 + .04mm. Sensoria distributed as follows: III 53-70 as a rule more than 57, covering most of segment, IV 16 covering all sides of segment, V 3-4 arranged irregularly, V 0-2. All sensoria are tuberculate, and variable in size. Media of fore wings twice forked, the second fork closer to the margin of the wing. Length of metathoracic femora 1.15mm. Length of metathoracic tibiae 1.725mm. Hair on outer margin of metathoracic tibiae fine, upstanding, varying in length from .10-.15mm. On this margin the hairs which are shorter are less upstanding than the longer hairs. Hairs on the inner margin of the hind tibiae are shorter, more numerous, and less upstanding than the hairs on the outer margin.

Cornicles with base measuring about .18mm. not much wider than height. Cornicles provided with two lengths of hairs, the shorter out numbering the long, the long hairs are fine, distinctly not spine-like as are those of the females. Dorsum of abdomen without setulae, in sharp contrast to the condition present in the apterous females.

Hair on dorsum of abdomen long and fine, approximately .11mm. in length. Harpes with numerous hairs which are shorter than those on the cauda.

This form differs greatly from what one would expect, knowing the structure of the apterous viviparous females. The cornicles lack the distinctly spine-like hairs found on the cornicles of the females and the dorsum of the abdomen not only lacks hairs of this type, but is without setulae. The hairs on the outer margin of the tibiae are much longer and finer than one would expect.

Oviparous female.

Length from vertex to end of anal plate varying from 4.05-4.38mm. Dr. L. G. Gentner who collected this form together with apterous viviparous females has sent me the following information which probably applies to both forms, but since the viviparous females outnumbered the oviparous females, and since no mention is made of the presence of powder, which may be expected on oviparous females, the notes may apply only to viviparous females. "Deep green, with a broad, pale greenish yellow, median longitudinal band, bordered on each side by a narrow dark green line. Smaller apterous forms which may be oviparous somewhat paler, more greenish in color, with the median band not so much in evidence."

Length of antennal segments as follows: III .57mm., IV .215mm., V .215mm., VI .18 + .045mm. Third and fourth antennal segments without sensoria, fifth segment with only primary. Hairs on antennae almost spine-like, those on anterior margin longer than those on the posterior margin. Metathoracic femora varying from 1.50-1.68mm. in length. Metathoracic tibiae varying from 2.10-2.47mm. in length. Length of metathoracic tarsal segments .15mm. and .55mm. Metathoracic tibiae with numerous small, very tuberculate sensoria that cover all of the surface except for the extreme base and apical fourth. The hairs on the outer margin of the hind tibiae are distinctly spine-like, quite upstanding and measure .10-.12mm. in length. The hairs on the inner margin are less upstanding, shorter, and less spine-like, as well as paler in color, than those on the outer margin, they are also more numerous. The hairs on both margins increase slightly in length towards the apex, the outer may also become less upstanding.

Cornicles not sharply differentiated from rest of abdomen in color, like those of apterous viviparous female, in being rather flat and with similar hairs, of two types. Dorsum of abdomen with setulose surface. Other features similar to those of apterous viviparous female.

Allotype, alate male. Morphotype, apterous oviparous female. Both types deposited in the United States National Museum. Collected by L. G. Gentner. Mt. Ashland, Jackson Co., Oregon, September 27, 1956. Taken on the lower branches of *Shasta fir*, *Abies magnifica* var *shastensis*.

Cinara chinookiana H.

Apterous male.

Length and general color.—Length from vertex to end of anal plate varying from 2.13-2.40mm. Dr. Gentner who collected the material from which this form is described records the color as follows: "Head and appendages black, black markings on thorax, abdomen greenish."

Cleared specimens indicate the antennae as brownish-black with the basal third of third segment paler. The dorsum of the abdomen has four rows of small wax pore plates, just median to the cornicles, just lateral to the outer row of wax pore plates there is a row of small pigmented spots, these are in line with the wax pore plates and the spiracles, which lie within pigmented areas. Pigmented spots anterior to the cauda, small, very irregular, provided with long hairs similar to those on the dorsum of the abdomen. Anterior to these pigmented areas and extending anteriorly as far as the cornicles, some of the hairs on the dorsum of the abdomen originate within small pigmented areas, which vary in size and shape. Cornicles with outer margins very irregular, with the anterior posterior axis much longer than the width. Harpes dark brown.

Head and thorax.—Length of antennal segments as follows: III .38-.405mm., IV .165-.17mm., V .21-.22mm., VI .17-.195 + .03mm. Sensoria distributed as follows: III 22-28, small, tuberculate, confined largely to posterior surface of segment, primary sensorium small. IV nine-fourteen, similar to those on third segment in size and position, primary sensorium likewise small. V nine-ten, primary sensorium large. VI seven-ten, two or more sensoria often more or less combined. Hair on anterior margin of antennae more numerous and longer than the hair on the posterior margin, varying in length from .06-.12mm. Marginal sensoria far removed from primary. Length of metathoracic femora varying from .825-.90mm. Length of metathoracic tibiae varying from 1.20-1.27mm. Hairs on these segments quite similar to those on the femora and tibiae of the viviparous female. Length of metatarsal segments .105 and .30mm.

Abdomen.—Cornicles with two lengths of hairs, the longer much longer than the shorter. Harpes suggestive of a mitten in shape, the thumb of which is rather long and thin, covered with moderately long hairs. Cauda and anal plate with setulae, both with two lengths of hair.

Oviparous female.

Length from vertex to end of anal plate varying from 3.75-3.38mm. Dr. Gentner has sent me the following color notes, which most likely also apply to the apterous viviparous female, since both forms were included in the same vial, "Shining reddish-brown, with yellowish-brown appendages, head dark, cornicles black." Antennal segments with the following lengths: III .375-.395mm., IV .18mm., V .225mm., VI .18 + .03mm. Third antennal segment without sensoria, fourth as a rule without secondary sensoria, sometimes with one, primary sensorium present. Fifth antennal segment with one or two secondary sensoria, and large primary. Sixth antennal segment weakly imbricated. Metathoracic femora varying in length from 1.02-1.125mm. Metathoracic tibiae varying in length from 1.38-1.50mm. Hind tibiae with a moderate number of small tuberculate sensoria, which are not very distinct. Other features similar to those of apterous viviparous female.

Allotype, apterous male. Morphotype oviparous female. Both types deposited in the United States National Museum. Collected by Dr. Louis G. Gentner. Crater Lake, Oregon, October 2, 1956. Host, *Abies lasiocarpa*.

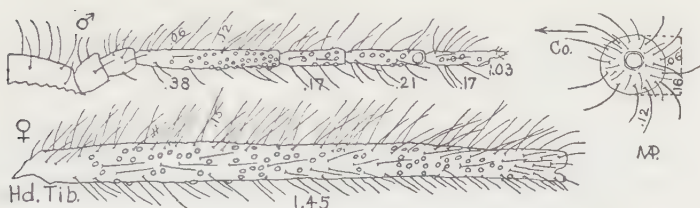
Cinara rustica H.*Alate viviparous female.*

Length from vertex to end of anal plate varying from 2.45-3.225mm. Color not closely observed, but dark dusky. Length of antennal segments as follows: III .42mm., IV .19mm., V .21mm., VI .10 + .03mm. Sensoria distributed as follows: III 2-4 plus primary, the secondary sensoria are arranged in a row, and show considerable variation in size. IV with only primary sensorium. V with one secondary and primary sensorium. All primary sensoria with wide rims. Hair on antennae sparse, upstanding, and about .07mm. in length. Third, fourth and fifth antennal segments pale with apical portions dusky. Ocular tubercles present and normal in size. Lateral lobes of thorax with hairs limited to the median portions of lobes. Media either once or twice forked. Posterior margin of stigma with a number of hairs. Stigma outlined with a fuscous border. Cornicles with outer margin quite regular. Width of cornicles .42mm. Metathoracic femora 1.05-1.20mm. in length, hairs fine upstanding, shorter than width of femora. Metathoracic tibiae 1.90-1.95mm. in length, hair similar to that of apterous viviparous female. Dorsal surface of abdomen with comparatively few hairs, ventral surface of abdomen with numerous hair. Ventral and dorsal surfaces of abdomen clothed with extremely fine, short, very closely spaced setulae. Pigmented spots anterior to the cauda widely separated, broad, provided with hairs along the posterior margin, the hairs being arranged in one to three rows. Cauda and anal plate clothed with numerous fine, short, dusky setulae. Hairs on cauda confined largely to the posterior margin.

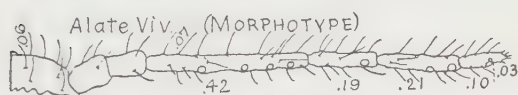
Specimens of this species feed on the needle free bark of more mature twigs of *Pinus edulis*. Morphotype, alate viviparous female, collected in type locality, deposited in the United States National Museum. Host, *Pinus edulis*. Springerville, Arizona, August 25, 1956.

Schizolachnus curvispinosus H. E. K.*Alate male.*

Length 2.13mm. Color of living specimen not recorded, mounted specimen dark brown, color most likely quite similar to that of females. Antennal segments with the following lengths: III .57mm., IV .29mm., V .26mm., VI .19 + .03mm. Sensoria on antennal segments as follows: III about 70, IV about 16, V about 8. Primary sensoria not distinctly different from secondary. Antennal hair not numerous, fine, sharp-pointed, slightly curved but not distinctly bent. Hair on femora fine, sharp-pointed curved. Hairs on tibiae only moderately coarse, curved but not distinctly bent, about .09mm. in length. Hairs on outer margin of metathoracic tibiae more upstanding and slightly longer than hairs on inner margin. All hairs on tibiae arising from distinct tubercles, making the tibiae look warty. It should be noted that the hairs on the antennae, femora and tibiae are distinctly unlike the hairs on similar parts of the females. Media simple. Hairs on dorsal surface of second tarsal segment coarser and longer than the hairs on the ventral surface. Length of metathoracic femora 1.05mm. Length of metathoracic tibiae 1.65mm. Length of metatarsal segments .075 and .30mm. Hairs on dorsum of abdomen finer, and longer than hairs on the females. Harpes with one posterior corner almost square, the other with a long finger.



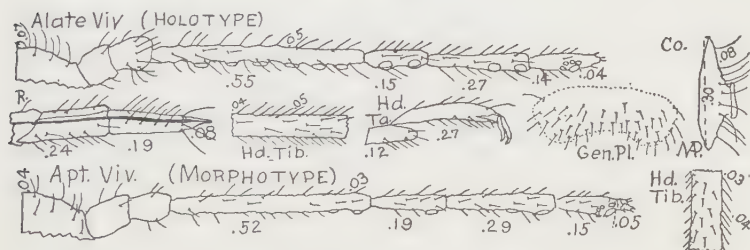
CINARA chinookiana H.



Cinara rustica H.



Schizolachnus curvispinosus HEK



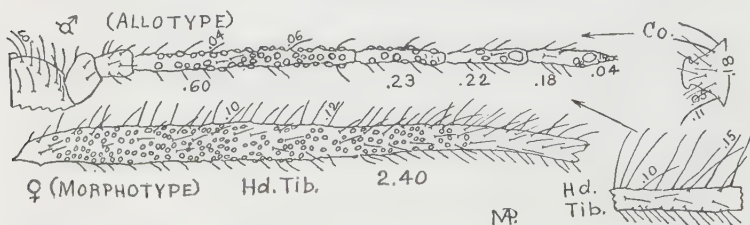
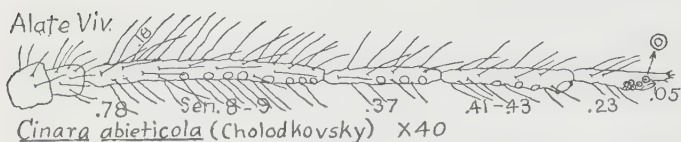
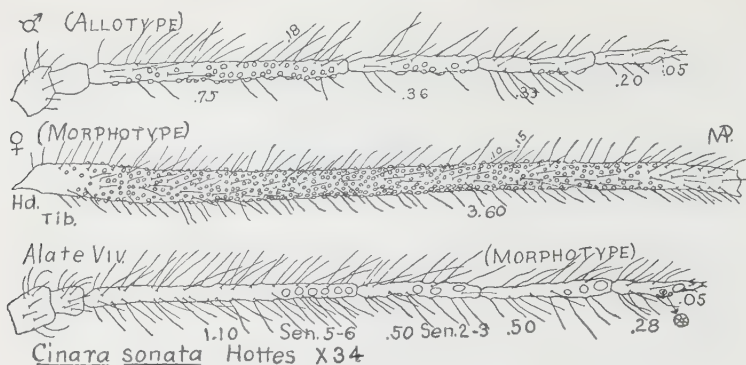
CINARA curtihirsuta H&E

Allotype, alate male, deposited in the United States National Museum. Butte Falls, Oregon, October 5, 1956. Coll. L. G. Gentner. Host, *Pinus ponderosa*.

Cinara curtihirsuta H & E

Apterous viviparous female.

Length from vertex to end of anal plate 3.67mm. Color not recorded from living specimens. As cleared and mounted yellowish-brown, with apical portions of third, fourth and fifth and all of sixth antennal segments dusky. Apical portions of femora distinctly darker than the base. Tibiae with distal portions dusky brown, the brown much more extensive on the metathoracic tibiae. Cornicles brown. Length of antennal segments as follows: III .52 mm., IV .19 mm., V .29mm., VI .15 + .05mm. One secondary sensorium either present or absent on third antennal segment, fourth antennal segment with one secondary



***CINARA setulosa* H&E.**

sensorium present. All other antennal segments with primary sensoria. Antennal hair not numerous, fine, sharp pointed, shorter than width of segment, varying in length from less than .03mm. to .03mm. Vertex of head with few hairs, which are similar to those on third antennal segment. Length of metathoracic femora 1.50mm. Length of metathoracic tibiae 2.70mm. Metatarsal segments .07 and .27mm. Hair on metathoracic tibiae varying in length from .03-.04mm. hair on the same segment of the alate viviparous female reaching a length of .05mm. but sometimes shorter. Mesosternal tubercle absent. Opening of cornicle distinctly acentric, much closer to posterior margin than to anterior margin. Hair on cornicles sparse, outer margin almost free from hairs. Transverse pigmented spots very narrow, with a row of coarse brown hairs along the posterior margin. Cauda and anal plate with setulae very well developed. Hairs on cauda confined largely to posterior surface. Morphotype, apterous viviparous female, deposited in the United States National Museum. Host, *Abies concolor*. Bly, Oregon Aug. 8, 1956 Coll. Joe Schuh.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE SYSTEMATIC POSITION OF THE MARMOSET,
SIMIA LEONINA HUMBOLDT (PRIMATES)

BY PHILIP HERSHKOVITZ

Curator of Mammals, Chicago Natural History Museum

It had been generally supposed by most authors, including the writer (1949:424), that *Simia leonina* Humboldt was a golden-maned marmoset related to, if not identical with, *Simia rosalia* Linnaeus. As Humboldt's marmoset is type of *Leontocebus* Wagner (1840:ix, 248), this generic name was used for the golden-maned, or little lion, monkeys. Cabrera (1956:49) has now shown conclusively that *Simia leonina* is really a member of the group of hairy-faced marmosets, better known as tamarins, characterized by a white circumlabial band. He therefore replaced *Tamarin* Gray with *Leontocebus* as the generic name for the hairy-faced forms. Because of priority, *Leontocebus* was also used to embrace the bare-faced marmosets of the recognized subgenera *Marikina* Lesson and *Oedipomidas* Reichenbach. In the absence of another available generic name Cabrera proposed *Leontideus*, with type *Simia rosalia* Linnaeus, for the true little lion monkeys. Except for the changes in technical names, the classification of marmosets adopted by Cabrera follows my arrangement of 1949 (pp. 409 et seq.). The exact characters of *Simia leonina* Humboldt and its relationship to other hairy-faced marmosets, however, still requires elucidation.

At hand is a series of 16 specimens of hairy-faced tamarins collected by the writer in 1952 between the Ríos Caquetá and Putumayo, South-eastern Colombia. This is the type region of *Simia leonina* Humboldt. Except for the very different pygmy marmoset, *Cebuella pygmaea*, no other member of the family *Callithrichidae* occurs in the area. Discounting vagaries of the original description of *Simia leonina* and liberties taken by the artist in depicting an animal he never saw, the present series exhibits all positive diagnostic characters of Humboldt's monkey. The head of the type of *Simia leonina* is described as "*nigrescens*" (Humboldt, 1805:31). In the 16 specimens at hand, the head, including

face and crown, is black. The mantle and hind limbs of the series are buffy finely ticked with black in conformity with the original description and colored plate of the type (op. cit., pl. 5). In the colored figure, however, the head is also buff, in contradiction to the text. The tail of the figure is likewise uniformly pale brown but the text describes it as "*superne atra, inferne badia.*" In the series, the tail agrees with the text in being blackish above and brownish beneath for from one-third to two-thirds its length. The back, in Humboldt's description, in the stylized figure, and in the series, is striated, or marbled, blackish and pale buff ("*dorsum maculis et striis albo-flavescentibus variegatum*"). The underparts of the series are brown as in the figure. In the text the underparts are understood as included in the "*corpus ex badio olivaceum.*" Head and body length of *Simia leonina*, estimated from the living animal, no doubt an immature, is given as 7 or 8 French inches, i.e., from 190 to 217 centimeters. Means and extremes of the external measurements of the 16 specimens at hand are: head and body combined, 225(212-234); tail, 348(296-383); hind foot, with claw, 71(64-77), ear, from notch, 28(26-31).

Thus, the status of *Simia leonina* Humboldt as a tamarin of the black headed, red-mantled group (cf. Hershkovitz, 1949:412-413, II-D) is confirmed by present topotypes, the first to be recorded since the original description. Humboldt's marmoset, therefore, is most nearly related to *Leontocebus illigeri* Pucheran from the Amazon in extreme south-eastern Colombia. In the latter, however, the mantle is dark reddish with the individual hairs uniformly colored except for their dark bases. This tonal color difference between *illigeri* and *Simia leonina* may be of less than specific grade, but pending a revision of the marmosets, the two are kept apart.

It is of interest to note that in his analysis, Cabrera (1956:51) compared Humboldt's description of *Simia leonina* with the colored figure of a marmoset identified by Cruz Lima (1945: pl. 38, fig. 1) as "*Tamarin nigrifrons nigrifrons.*" Actually, the figure appears to have been depicted from a specimen of *Leontocebus illigeri* with the reddish haired skin of the nape pulled up over the crown.¹ The figure of *Tamarin* [= *Leontocebus*] *lagonotus*² in the same work (pl. 36, fig. 2) shows the black head with the reddish mantle, arms and thighs characteristic of the *Simia leonina*-*illigeri* group.

The name *Simia leonina* Humboldt dates from the first edition of the *Recueil d'Observations de Zoologie et d'Anatomie comparée*, published in 1805. The same name was used by Shaw in 1800, for a species of macaque. The next available binomial for Humboldt's marmoset is *Leontopithecus fuscus* Lesson (1842:9). This then becomes *Leontocebus* (*Leontocebus*) *fuscus* Lesson, with type, the original description and figure of *Simia leonina* Humboldt. *Leontopithecus* Lesson, falls in the synonymy of *Leontocebus* Wagner.

¹The type of *nigrifrons* I. Geoffroy, is a black mantled, brown crowned tamarin of unknown locality. It is probably identical with *Leontocebus fuscicollis* Spix. Unfortunately, the marmoset figured by Cruz Lima (1945:pl. 38, fig. 3b) as "*Tamarin fuscicollis*" should have been labelled *Tamarin* [= *Leontocebus*] *weddelli*. The characters of true *fuscicollis* Spix are shown in the figure identified by Cruz Lima (1945:pl. 26, fig. 1) as "*Tamarin nigricollis.*"

²A synonym of *illigeri* but possibly valid as a subspecies.

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PROCEEDINGS
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GEOPHILOID CHILOPODS TAKEN IN THE
NORTHERN ANDES IN 1954-1955

BY RALPH V. CHAMBERLIN

This paper is a report upon the centipeds of the Order Geophilida collected on the California Academy of Sciences Expedition of 1954-55 which covered an area in the Andes Mountains extending from Peru through Ecuador and into Colombia. All specimens herein described or referred to as part of the chilopod collection were taken by Dr. Edward S. Ross and E. I. Schlinger. I feel much obligated to Dr. Ross for the privilege of studying this material which is of no little importance in amplifying our knowledge of the myriopod fauna of the Andean region.

Order GEOPHILIDA
Schendylidae

Schendylurus andesicola new species

Color dull yellow. Length, about 28 mm. Pairs of legs, 47.

Head of form shown in Fig. 1, without frontal suture, overlapping the basal plate which is broadly trapeziform and short. Clypeal area relatively large, bearing two setae. In front of this area two stouter setae and at some distance caudoectad of it on each side a series of four stout setae.

Prehensors when closed a little exceeding the anterior margin of the head, all joints unarmed.

Embayment of the labrum somewhat wider and proportionately shallower than that of *dentifer* but of the same general structure otherwise.

First sternites with a shallow recess beneath a chitinous anterior margin, an obtuse angle of preceding sternite fitting into this recess. Ventral pores in a circular area, beginning on second sternite.

Last sternite broad, its caudal margin convex, the plate bearing a number of long setae and across the caudal border a band of dense, short fine hairs as shown in Fig. 2.

Praetarsus of anal leg represented by a finely acute, straight chitinous point as shown in Fig. 3.

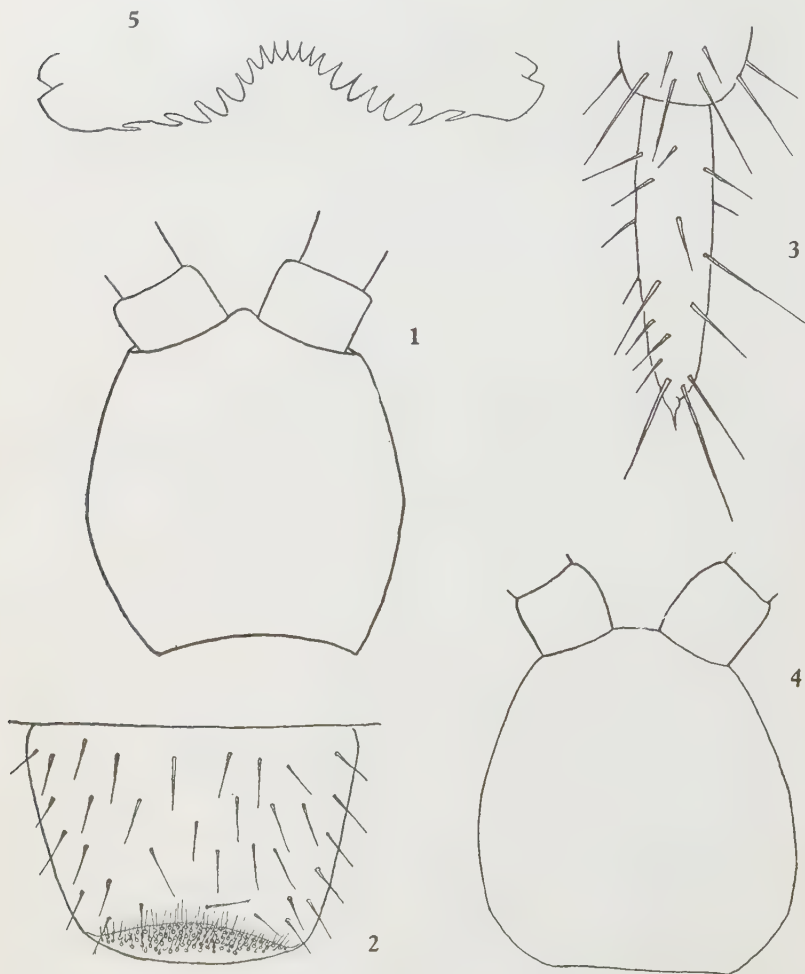
Locality.—Ecuador: 30 mi. S. of Alausi, Chimborazo. Holotype taken February 20, 1955.

Schendylurus dentifer new species

General color, pale yellow. Length, about 26mm. Pairs of legs, 45.

Form of the head shown in Fig. 4. A spot of reduced polygonal areoles near middle of clypeus. Reentrant angle of labrum deep; teeth stout and conical with exception of two at each lateral end of the series which end in slender tips. (Fig. 5). Claw of second maxillae closely pectinate on both margins. First maxillae bearing a lappet from the syncoxite on each side. Dental plate of mandible divided into three blocks.

Claws of prehensors when closed attaining or slightly exceeding anterior margin of head; each claw with a small but distinct conical tooth at base; other joints unarmed.



No ventral pores on first sternite, a few on second; pores on other sternites in an undivided circular area, numerous.

Last sternite wide, its lateral borders covering the pores on each side.

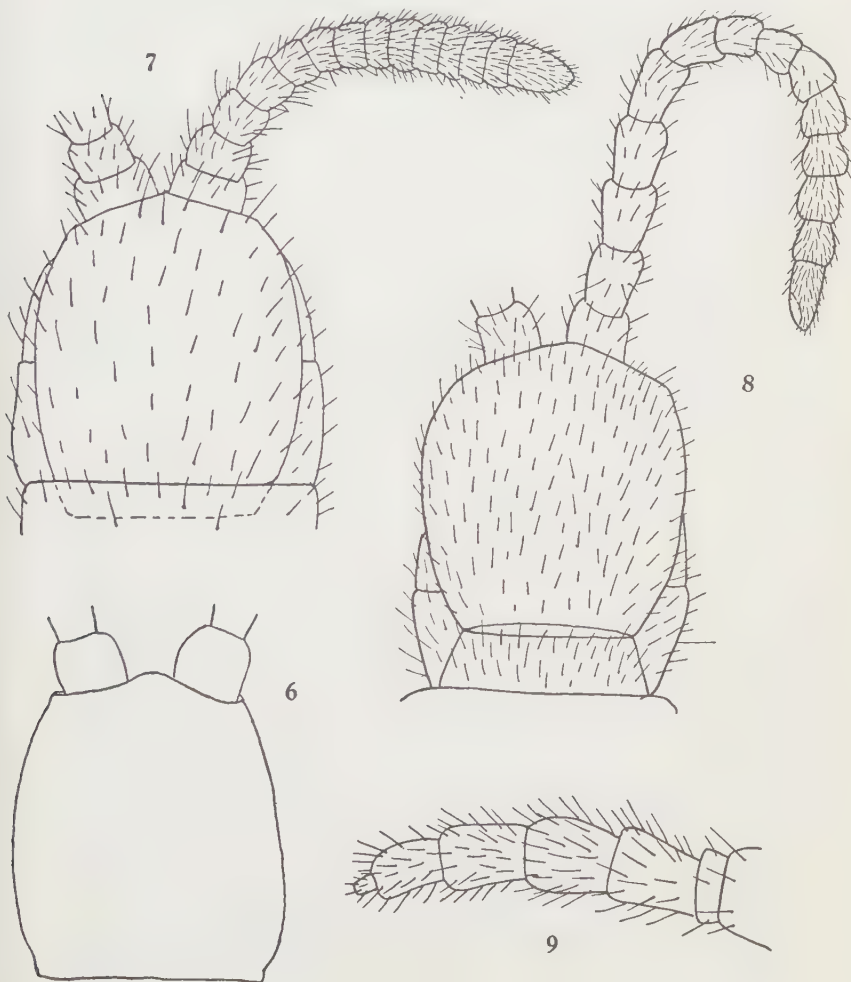
Locality.—30 mi. N. of Latocunga, Cotopaxi. Holotype taken February 21, 1955.

Distinguishable from *andesicola* in the presence of the tooth on claw of prehensors and in having the coxal pores covered, etc.

***Schendylurus pallidus lomanus* new subspecies**

Color plate yellow. Length, 17mm. Pairs of legs, 43.

Clypeal area bearing two setae. In front of this area a second pair of setae.



The head as a whole proportionately broader than in *pallidus* (Fig. 6). First maxillae without external lappets.

Claws of prehensors unarmed and prefemur without tooth or nodular prominence.

Last sternite with caudal and lateral margins convex covering the pores on each side. (Fig. 10.)

Tarsal joints of anal legs slender, without trace of a praetarsus at the tip.

Locality.—Peru: 16 mi. NW Chancay, Loma Lachay. Holotype taken January 12, 1955.

Dr. Kraus gives the number of pairs of legs of his *pallidus* as 53, probably the number in the holotype, without indicating any variation of this number in the paratypes. This contrasts with 43 pairs in the present species which seems also to differ in the form of the last sternite as well as in that of the head. (Cf. fig. 10).

Ballophilidae

Diplethmus ribauti Chamberlin

Locality.—Colombia: 2 mi. W. of Alban, Condin Amarea. One specimen, March 14, 1955.

This species was previously known from Colombia at Camelia, near Angelopolis in the Central Cordilleras.

Genus *Zygethmus*, new

A genus agreeing with *Diplethmus* in having the ventral pores of the sternites in two well separated areas which, however, are not elevated as they are in that genus. It also differs importantly in having only one, instead of two, coxal pore on each side. The nearly vestigial form of the second tarsal article of the anal legs would seem also to be of generic importance.

Generotype.—*Zygethmus pantenus* new species

This new genus may be placed with reference to the other known genera of the family by means of the following key.

Key to Genera of the Ballophilidae

1. Ventral pores diffuse, in an indistinctly limited band on caudal border of sternite; antennae short, with joints broader than long *Taeniolinum* Pocock
- Ventral pores in one or two mostly sharply defined submedian areas; antennae longer 2
2. Ventral pores in a single area 3
- Ventral pores in two circular areas 9
3. Antennae decidedly clavate 4
- Antennae not truly clavate 8
4. Prehensors lacking distinct sclerotic lines *Ballophilus* Cook
- Prehensors with definite sclerotic lines 5
5. Each anal coxa with a single pore 6
- Each anal coxa with two pores 7
6. Coxal pore composite *Clavophilus* Chamberlin
- Coxal pore simple *Tanophilus* Chamberlin

- 7. Ventral pore area transversely elliptic *Thalthis* Attems
- Ventral pore area strictly circular *Ittyphilus* Cook
- 8. Antennae short, attenuated distad *Leptyniphilus* Chamberlin
- Antennae longer, geniculate, the last six articles set off in form and size from the others *Cerethmus* Chamberlin
- 9. Coxal pores two on each side; second article of tarsus of anal legs of normal size *Diplothmus* Cook
- One coxal pore on each side; second tarsal article of anal legs greatly reduced, nearly vestigial *Zygethmus* gen. nov.

***Zygethmus pantenus* new species**

Length, 21mm. Pairs of legs, 47.

Head longer than broad in about the ratio of 25:23; anterior margin as a whole convex, the caudal margin wide and straight, the sides gently convex; no frontal suture. Antennae filiform, of uniform thickness throughout, typically curved at middle but not geniculate. (Cf. fig. 8.)

Prebasal plate exposed at middle. Basal plate broadly trapeziform. Claws of prehensors when closed not attaining the front margin of head. All joints of prehensors unarmed. Prosternum also without teeth, with chitinous lines.

Ventral pores in two well separated areas near middle of sternite; beginning on second sternite; the poriferous areas not at all elevated.

Last ventral plate subtrapeziform but not more than moderately narrowed caudad. A single coxal pore on each side, the gland apparently composite.

Anal legs in the male with all joints crassate except the second tarsal which is abruptly reduced. (Cf. fig. 9.)

Locality.—Ecuador: 8 mi. W. of Pante, Azuay. February 17, 1955.

***Ittyphilus calinus* new species**

Length, about 19mm. Pairs of legs, 43.

Antennae curved at middle but not truly geniculate, moderately clavate beyond middle. (Fig. 7.) Claws of prehensors when closed extending a little beyond anterior margin of head. All joints of prehensors unarmed. Prosternum with sclerotic lines, unarmed anteriorly.

Dorsal plates bisulcate.

Ventral pores in the usual single, circular area.

Anal legs in the male conspicuously crassate, its distal article conical.

Last ventral plate broad, moderately narrowed caudad, the sides convex and the caudal corners rounded. Two large coxal pores on each side.

Locality.—Colombia: 13 mi. W. of Cali, Valle. Male holotype taken March 20, 1955.

This species differs from *I. guianensis* in having the antennae much less strongly crassate and less geniculate; also differing in the number of pairs of legs—43 as against 49–55.

Oryidae

***Notiphilides maximiliana* (Humbert and Saussure)**

Locality.—Peru: Monson Valley, Tingo Maria. A male and a female taken October 26, 1954.

Orphnaeus brevilabiatus (Newport)

Localities: Ecuador: 6 mi. S. of Santa Rosa, El Oro; four, January 23, 1955; 27 mi. SW. of Quevado, Los Rios; one, February 5, 1955; Pichilingue, two, February 2, 1955.

Colombia: 15 mi. S. of Corinto, Cauca, one, March 6, 1955; 17 mi. W. of Sevilla, Valle, one, March 8, 1955; 27 mi. W. of Cali, Valle, March 21, 1955.

Peru: Monson Valley, Tingo Maria, December 18, 1954, and a variant specimen from the same locality taken October 10, 1954.

Chilenophilidae

Ribautia rossi new species

Body yellow, the head and prehensors chestnut.

Length, about 22mm. Pairs of legs, in all three specimens, 47.

Head about two thirds as wide as long; widest at middle; strongly rounded about the corners; caudal margin short and straight; no frontal suture. (Fig. 15). A distinct, small clypeal area toward anterior border of clypeus, its areoles very small, bearing three setae.

Median piece of labrum transversely oblong, the caudal face roughened but not dentate; lateral pieces moderately pectinate along inner half. (Fig. 11.) Maxillae presenting the usual general features. Prehensors much exposed from above laterally and anteriorly; claws when closed reaching distal end of the second antennal article; claw armed at base with an acute, conical black tooth, the prefemur with a similar but smaller tooth at distal end. Prosternum on anterior margin with a prominent rounded tooth each side of the median incision.

Ventral pores in a circular area beginning on second sternite and present on others of anterior half of body only. On each typical sternite two long sublateral setae on each side, these setae equal in length; sparsely arranged over the surface are fine and short hairs, those of two rows between the posterior major setae appearing especially conspicuous.

Last ventral plate wide, narrowing caudad, the caudal margin convex. Coxal glands opening through three well defined, large pores on each side, the posterior two of these pores free, the anterior one about half covered by the sternite. (Cf. fig. 12.)

Anal pores present.

Locality.—Ecuador: Pichilingue. Three taken February 1955.

This species much resembles the Colombian *E. fuhrmanni* but has ventral pores only on sternites of the anterior half of the body instead of on all from the second to the penult. It also differs in having only three coxal pores on each side instead of from 5 to 7 in having the median piece of the labrum free and edentate, and in having the teeth of the comb of the lateral pieces finely tipped rather than frayed distally. Pairs of legs 47 as against a normal 53.

Genus *Schizoribautia* Brolemann

The known American species regarded as pertaining to this genus in the restricted sense may be separated by means of the following key.

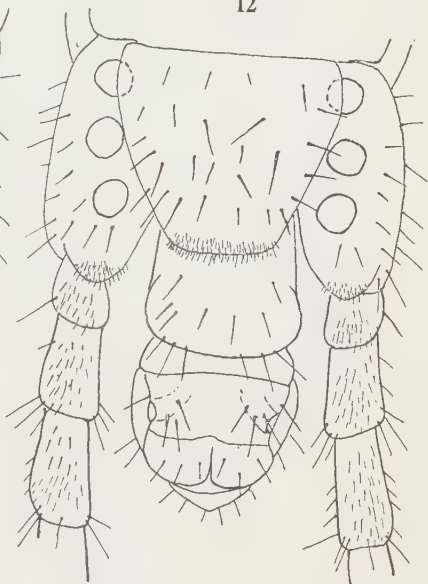
Key to Species of *Schizoribautia*

1. Ventral pores present on sternites from second or third to the penult 2
- Ventral pores present only on anterior half of body 4
2. Coxal glands in two groups on each side; ventral pore areas all undivided *S. centralis* (Silv.) 3
- Coxal glands in three groups; some ventral pore areas divided 3
3. Middle piece of labrum oblong, bearing numerous fine teeth *S. peruana* Verhoeff
- Middle piece narrowly triangular, margin simply fimbriate *S. titieacae* Turk

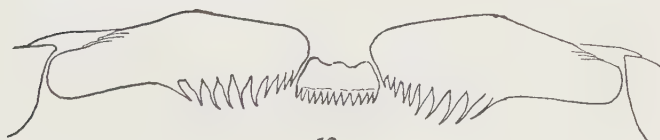
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12



11



13

4. Median piece of labrum nearly as wide as lateral pieces; sternites lacking the usual two large sublateral setae *S. seydi* (Ribaut)
- .. Median piece not this large; sternites with the long sublateral setae present 5
5. Prefemur of prehensors with no median tooth and prosternum also lacking true teeth *S. phana* (Chamb.)
- .. Prefemur with a well chitinized tooth or tubercle at middle; prosternum with distinct teeth or chitinous tubercles 6
6. Ventral pore areas increasing in size on posterior sternites of the series and becoming subelliptic; two setae on median line of clypeus but none caudocetad of clypeal area *S. carpisha* n. sp.
- .. Ventral pore area not thus changing in size and form; clypeus with two setae caudad of clypeal area but none on the median line
..... *S. junina* n.sp.

Schizoribautia carpisha new species

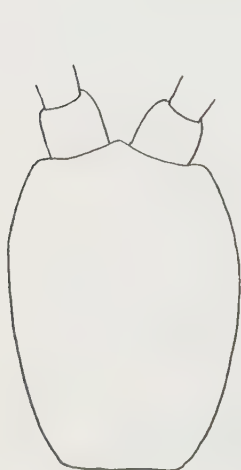
Length, 34mm. Pairs of legs, 51.

Head of the form shown in Fig. 14.

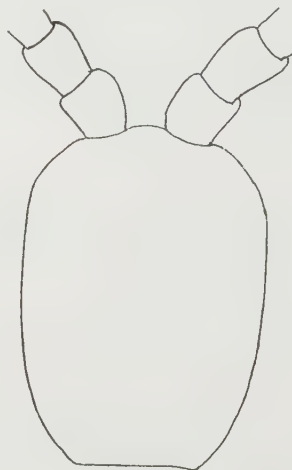
A clypeal area on the anterior border, composed of minute polygonal areoles and clearly set off. The area bears a pair of setae on its caudal portion and two on the median line in front of these. Back of the clypeal area on the median line are two setae.

Labrum with median piece transverse, bearing about twelve conical teeth; lateral pieces strongly pectinate on inner half (Fig. 13). Processes of first maxillae about equal in length; the inner process with six long setae on ventral face; the outer process with twelve similar setae. Coxae of second maxillae bearing at mesodistal corner the usual stout process; palpus on distal joints bearing numerous long setae which exceed the claw in length.

Prehensors much exposed laterally and anteriorly, the claws when



14



15

closed attaining the distal end of the second antennal article; basal plate proportionately short, overlapped by the cephalic plate; prefemur bearing within at distal and an acute black tooth, a similar one at base of claw; prosternum bearing a distinct dentiform and well chitinized nodulae each side of the median incision.

Of the two large sublateral setae on each side of the typical sternite the anterior is moderately longer than the posterior; minute hairs sparsely distributed over the sternite. Ventral pores in a median circular area beginning on second and present on others of anterior half of body. Last sternite broad. Coxal glands in three clusters, their pores free.

Locality.—Peru: Carpish Mountains, 40 mi. SW. of Tingo Maria.

Schizoribautia junina new species

Light brownish, the head and prehensors chestnut.

Length, 43mm. Pairs of legs, 51.

Head oblong, nearly two-thirds as wide as long, a little widest at level of labrum, narrowing in conspicuously toward ends.

A clypeal area on anterior border, its areolation fine; the area bearing four setae, two at middle and two near caudal edge; on each side of clypeus caudoectad of the area two setae, one much longer than the other.

Median piece of labrum, subtrapeziform, bearing on caudal side about ten close-set conical teeth which decrease in size from the middle ectad. Lateral pieces of labrum strongly pectinate as in *carpisha*. First maxillae with inner processes each bearing eleven stout setae on its ventral face, the four process or palpus bearing six similar setae toward distal end. Coxae of the second maxillae separated, each bearing the usual process at distomesal corner; distal article of palpus bearing numerous long setae, the adjacent joint bearing fewer similar setae.

Prehensors much exposed from above as usual; claws when closed attaining distal end of second antennal article; femuroid with a black conical tooth at distal end and a smaller tooth near middle; claws also with a stout tooth at base; prosternum anteriorly with two dark teeth.

Sternites not sulcate. Ventral pores in a circular area beginning on the second sternite and present only on other sternites of anterior half of body. Each sternite bearing two submarginal major setae on each side, of which the anterior is much the larger.

First spiracle largest, vertically elliptic, the others circular.

Last ventral plate broad, narrowing caudad, the caudal margin convex.

Coxal glands in three clusters on each side, the three pores covered by the sternite.

Anal pores present.

Locality.—Peru: 37 km. E. of Cashuamayo, Junin. Two specimens taken October 15, 1954.

Schendylurus andesicola n. sp. Fig. 1. Head in outline. Fig. 2. Last sternite. Fig. 3. Second tarsal joint of anal leg.

Schendylurus dentifer n. sp. Fig. 4. Head in outline. Fig. 5. Labrum.

Schendylurus pallidus lomanus n. subsp. Fig. 6. Head in outline. *Ityphilus calinus* n. sp. Fig. 7. Head. *Zygethmus pantinuss* n. sp. Fig. 8. Head. Fig. 9. Anal leg.

Schendylurus pallidus lomanus subsp. n. Fig. 10. Caudal end of body, ventral view. *Ribautia rossi* n. sp. Fig. 11. Labrum. Fig. 12. Caudal end of body, ventral view. *Schizoribautia carpisha* n. sp. Fig. 13. Labrum.

Schizoribautia carpisha n. sp. Fig. 14. Head in outline. *Ribautia rossi* n. sp. Fig. 15. Head in outline.

PROCEEDINGS
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THE TYPE LOCALITY OF *BISON BISON* LINNAEUS

BY PHILIP HERSHKOVITZ

Curator of Mammals, Chicago Natural History Museum

The basis for the name *Bison bison* Linnaeus (1758:72) was restricted by Thomas (1911:154) to the "'*Taurus mexicanus*' of Hernandez, Mexico, p. 587." Accordingly, he declared "'Mexico,'" with the reservations implied by his quotation marks, the type locality of the species.

Designation of México as type locality has met with valid objections. Bison do not live now within the present confines of México and there is no positive evidence that they ever did in historic time. The question of their distribution has been examined recently by Reed (1952:390) and by Baker (1956:325). The first rejected México and substituted southern or southeastern United States as type locality. The second demurred and held for northeastern México as a proper restriction. Each authority cited a number of documents in support of his opinion but neither applied to the primary Linnaean source for the description of the bison and the details of its habitat.

The full title of the work cited by Linnaeus is *Rerum Medicarum Novae Hispaniae Thesaurus sui Plantarum Animalium Mineralium Mexicanorum Historia*, by Francisco Hernández, published 1651, in Rome. The page reference is 587.

At the head of the page cited appears a woodcut of a bison under the Latin title *Taurus Mexicanus*. The first paragraph of the account that follows is a description of the animal by Iohnes Faber, one of the editors of the Hernández manuscript. His opening sentence explains that the original from which the figure was copied bore no name either Latin or Mexican. After 10 pages devoted to a review of wild and domestic cattle in general, the author declares that bison like the one described and figured are to be found in the New World province of Quivira. Inasmuch as the publication is devoted primarily to a description of Mexican plants, animals and minerals, the bison, in Faber's opinion, should also be called Mexican rather than by the more general denomination, American. This explains the controversial title *Taurus Mexicanus*. Faber also informs that bison were reported from Florida where they are called *butrol*.

The elaborate dissertation on cattle by editor Faber was inspired by the brief account of bison written by Hernández himself and included in the first treatise of the addendum to the same volume. This section

of the published parts of the original manuscript by *Hernández* bears the title *Historiae Animalium et Mineralium Novae Hispanae*. The bison is described in chapter 30, page 10, as follows, translated from Latin.

“The Cattle of the Quivira Region

“(Concerning one of them, see page 587 above, by Io. Faber).

“When the Spaniards entered in these regions [i.e. the Coronado expedition to the Quivira], they encountered, among other marvelous things, herds of wild cattle of moderate size with humped back, thick mane and long dewlap. The color of the whole body is dark; the meat is not inferior in taste or less wholesome than that of our own cattle. The natives first drink the blood then eat the meat raw and they use the hides for protecting their bodies against the cold. I have heard that one of these cattle was brought to Philip the Great [the one figured and described by Faber] and that a race of hump backed men are also to be found beyond the river Acunchis.”

The Quivira Region has been identified as the site of villages of Wichita Indians in central Kansas. According to Indian tales, these settlements contained fabulous wealth in precious metals. Francisco Vázquez de Coronado, who sought them in 1541, found only rich soil, primitive Indians and wild cattle. Indeed, Coronado and his men were the first Europeans to see the immense herds of American bison (cf. Bolton, 1949:282). Hernández who lived in México during the last half of the 16th century may have learned about bison directly from members of Coronado's party.

The exact locality of the “type” of *Bison bison* Linnaeus, therefore, is the ancient “Quivira Region,” then “Mexico,” now central Kansas. This may be regarded as the precise *type locality*.

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AN UNRECOGNIZED POCKET GOPHER FROM
WISCONSIN

BY HARTLEY H. T. JACKSON

The taxonomic relationships of Wisconsin members of the pocket gopher genus *Geomys* have been problematic. In recent studies I have had available 112 specimens that represent fairly well the known distribution of the genus in the state. These specimens are in the following collections: U. S. Biological Survey, 21; Milwaukee Public Museum, 14; University of Wisconsin Zoological Collection, 8; University of Illinois Museum of Natural History, 69. For their courtesy, aid, and the loan of specimens for this study I am indebted to Dr. W. C. McKern, Milwaukee; Dr. John T. Emlen, Jr., Madison; and Dr. Donald F. Hoffmeister, Urbana.

The exact type-locality of *Geomys bursarius bursarius* (Shaw) is unknown, but is now usually considered as near Elk River, Sherburne County, Minnesota. In the original description the specimen is said to have come from the fur trade of the Northwest Territories and to be unavailable at the time and in the possession of "Governor Prescott" (George Shaw, Trans. Linnaean Soc. London, vol. 5, p. 227, 1800). It could conceivably have come from northwestern Wisconsin which probably pocket gophers and certainly fur traders inhabited at that early day. As a basis of comparison of *Geomys b. bursarius*, however, I have used a series of 40 specimens from Elk River, Minnesota, in the U. S. Biological Survey and U. S. National Museum collections. The Wisconsin range of the subspecies *bursarius* as determined by the present studies is confined to the east side of the Saint Croix River drainage, and to the headwater drainages of the Brule and Iron rivers, which flow into Lake Superior. It ranges northward to within about 12 miles of Lake Superior. The Mississippi River watershed from the Chippewa River drainage south of latitude 45° 30' N to the north bank of the lower Wisconsin River, west of longitude 90° W, is inhabited by a race heretofore unrecognized.

Geomys bursarius wisconsinensis, subsp. nov.
Wisconsin Pocket Gopher

Type-specimen.—No. 243,055, U. S. National Museum, Biological Survey collection; adult ♀, skin and skull; collected September 13, 1922, by Hartley H. T. Jackson. Original number 1604.

Type-locality.—Lone Rock, Richland County, Wisconsin.

Diagnostic characters.—Similar in size, color, and superficial appearance to *Geomys bursarius bursarius*. Clearly separable by certain cranial characters. The premaxilla in *wisconsinensis* in superior view is narrower and somewhat concave posteriorly, whereas in the subspecies *bursarius* it is nearly flat or slightly convex posteriorly. The rostrum is somewhat narrower than in *G. b. bursarius*. Premaxilla distinctly and evenly incurved laterally anterior to premaxillary root of zygoma, whereas in *G. b. bursarius* the edge of premaxilla is nearly straight anterior to root of zygoma. Inner borders of premaxillae diverging posteriorly and thus widening the distance between their posterior tips. The most conspicuous difference between the two subspecies results from this wider space between the posterior ends of the premaxillae and is reflected in the broader anterior lobe of the frontal, which is about as broad as long in *wisconsinensis*, whereas in *G. b. bursarius* it is only about one-half as broad as long.

Measurements.—Type-specimen (adult ♀): Total length, 246 mm; tail vertebrae, 73; hind foot, 32. Skull: Type-specimen (adult ♀): Greatest skull length, 44.5 mm.; zygomatic breadth, 25.5; interorbital breadth, 6.9; maxillary tooth row, 8.0.

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NEW APTEROUS ARADIDAE (HEMIPTERA)

BY CARL J. DRAKE*

The present paper comprises the descriptions of one new genus and seven new species of apterous aradids. The types have been deposited as stated under the description of the various new species. In the measurements, 80 units equal one millimeter.

Acaricoris floridus, new sp.

Small, obovate, dark reddish ferrugineous, slightly shiny, without lateral lobes or projections on thorax or abdomen, widest behind middle of pronotum. Length (male), 3.00 mm., and (female) 3.15; width, (male) 1.12 mm. and (female) 1.52 mm.

Head 0.52 mm. long and 0.52 mm. wide across eyes, subquadrate, with low and narrow longitudinal ridges; juga narrow, flattened laterally, slightly surpassing tylus in the form of short, rounded, divergent, finger-like processes with rounded apices; tylus wide, with a median longitudinal row of tiny tubercles; each lateral shelf on practically same level and nearly as wide as median part of head on vertex, longitudinally ridged, moderately narrowed to neck back of eyes, with a small tubercle on lateral side behind each eye; eyes small, reddish; labial sulcus very wide, shallow, extending to neck; labium short, reaching to end of sulcus. Neck short, constricted. Antenniferous tubercles stout, divergent, narrowed apically, each with a blunt apex. Antennae 0.84 mm. long, with pale inconspicuous pubescence, rather short, with first segment stout, granulate, measurements—I, 0.26 mm.; II 0.15 mm.; III, 0.20 mm.; IV, 0.23 mm. Legs short, finely granulate.

Spiracles II, III and IV sublateral, scarcely visible from above unless connexiva are slightly turned up or abdomen a little tilted upward on one side; V, VI and VII lateral and thus visible dorsally or ventrally; VIII placed on end of a short, posteriorly-directed tubercle. Thoracic divisions and first two abdominal tergites all fused together in one piece, with transverse suture in front of and behind mesonotum (save on median ridge) distinctly indicated; median longitudinal ridge becoming wider posteriorly, with two to three small, longitudinal ridges up on median ridge, all ridges with smooth and shining surfaces; surface on each side of median ridge with small raised areas and longitudinal ridges. Abdomen with tergites III to VI (inclusive) fused together into one solid piece; connexival segments, also segmentation of body

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beneath, as in other members of the genus. Collar very short, narrow, exerted.

Holotype (male) and *allotype* (female), Highlands Hammock Park, Highlands County, Fla., taken from forest litter on the ground by means of a Berlese funnel, June 15, 1955, by H. S. Dybas, in Chicago Museum of Natural History. *Paratypes*, 4 adults (and numerous nymphs of various sizes) same data as type.

Differs from *A. austeris* Drake of Guadeloupe by not having a small lateral projection on each side of abdominal tergite VII and more pronounced median longitudinal ridge of thorax. *A. ignotus* Harris and Drake of the Gulf states has a lower and more rugulose median longitudinal ridge, wider anterior part of thorax and the dorsal abdominal gland of the fused tergites is black.

Eretmocoris insularis, new sp.

Small, obovate, slightly shiny, without lateral lobes or projections, widest behind middle of abdomen. Stigmata II, III and IV ventral, latter very near exterior margin, each of the other two slightly farther removed anteriorly; IV to VII (inclusive) lateral, visible from above, VIII (genital) placed on apical end of small posteriorly-directed process. Length, 3.80 mm.; width, 2.12 mm.

Head subquadrate, width across eyes (0.75 mm.) and median length subequal, rugulose, each lateral shelf a little narrower on vertex than median longitudinal part; eyes scarcely inserted at base, small, with a fairly prominent tubercle (extending laterally to middle of eye) just back of each eye, then with lateral shelf quickly narrowed to neck and granulate on surface of lateral side; neck narrow, short; juga surpassing apex of tylus, there stout, divergent, rounded with blunt apex, the tylus roundly declivent anteriorly; antenniferous tubercles large, divergent, narrowed to a blunt point. Labial sulcus deep, very wide, narrowed apically, the labium testaceous and extending to apex of sulcus. Antennae finely granulate, 1.15 mm. long, with basal segment stout and exceeding apices of juga by nearly half of its length, measurements—I, 25; II, 17; III, 28; IV, 22.

Thorax and abdominal segments I and II all fused together, with sutures in front of and behind mesonotum plainly indicated, with wide median part polished; median longitudinal ridge glossy, widened posteriorly, arising just behind pronotum, with two interrupted, rounded, testaceous ridges (one on each side of dorsal surface: interruptions indicating divisions of metanotum and abdominal tergites I and II); pronotum with median longitudinal furrow, with lateral sides concavely narrowed anteriorly and then anterolateral angles produced bluntly forward; anterior margin deeply widely excavated for reception of collar; collar short, smooth, wide, encircled by a deep furrow; mesonotum wider but not longer than pronotum back of collar, the lateral margins of all thoracic divisions granulate. Abdominal tergites III to VI (inclusive) united into a solid plate, sculptured, with the large dorsal gland blackish fuscous; ventral tergites IV and VII separated by usual sutures, the basal segments fused with sterna. Connexival segments marked off as in other members of the genus.

Type (male), Guadeloupe (Three Rivers), in Drake Collection (U.S.N.M.)

Separated from its congeners by the larger tubercle behind each eye, slightly longer antennae, thicker juga, absence of lateral lobes on abdominal segment VII and especially by the broken pair of carinae (one on each side of dorsal surface) up on top of large median ridge. The interruption of these carinae probably indicate the original divisions between metanotum and tergite I as well as between tergites I and II.

Tananarivea, new gen.

Large, thick, obovate, without lateral lobes or projections, with areas or linear markings of tomentose hairs. Head wide, thick, only slightly narrowed behind eyes, with neck short and little constricted; juga only slightly surpassing tylus; eyes small, exerted; lateral shelves thick, poorly defined. Labial sulcus rather long, wide, open behind; labium slightly longer than sulcus, not reaching to anterior margin of pronotum. Antennae moderately long, finely granulate; segment I swollen, not surpassing apex of juga, II shortest, III longer than IV. Legs short, slightly roughened.

Thorax and abdominal tergites raised, pro- and metanotum rather craggy, the abdominal scent gland prominent. Pronotum sloping downward anteriorly, not excavated for reception of short collar; mesonotum set off from both pro- and metanotum by usual transverse furrows; metanotum fused with first two abdominal tergites; abdominal tergites III to VI (inclusive) fused into one solid plate; connexival segments I and II fused, the others separated from one another by usual sutures. Abdomen beneath with segments IV, V and VI distinguishable by the usual sutures. Spiracles II to VI (inclusive) ventral, remotely removed from outer edge of segments; VII placed only slightly beneath the upper edge of the connexiva, scarcely visible from above; VIII placed on the posterior edge of the genital segment.

The color, thickness of body and general aspect are similar to the genus *Emydocoris* Usinger from South America. However, the thick head, much smaller eyes, much wider neck, poorly defined, thick, lateral shelves, and the position of spiracle VII readily separate the two genera. It should also be noted that the orificial canal and opening are rather similar in both genera, also the position of stigmata except VII.

The type species is

Tananarivea tiptoni, new sp.

Large, thick, broadly obovate, widest behind middle of abdomen, black with matted tomentose hairs sordid brown. Length, 10.00 mm.; width, 5.00 mm.

Head wide, thick, pretty much covered with matted tomentose hairs, moderately convex longitudinally, with longitudinal furrows on median part, slowly narrowed behind eyes, there with a rounded tubercle just behind each eye, width across eyes and median length subequal (2.10 mm.); eyes small, exerted; juga slightly exceeding tylus, bifid in front; tylus with dorsal surface on higher level than that of juga, longitudinally convex; vertex with each lateral shelf about half as wide as median longitudinal part, the shelves thick and not thin as in *Emydocoris* Usinger; neck very short, thick, very little constricted. Labium fairly long, extending slightly beyond apex of sulcus but not reaching to front margin of prosternum. Antennae moderately long, setose, with segment

I swollen and scarcely reaching to tips of juga, measurements—I, 70; II, 46; III, 60; IV, 50.

Thorax above inflated, with sides slowly rounded to collar; pronotum raised posteriorly, narrower in front than vertex, impressed and excavated at middle behind, more than twice as long as mesonotum; mesonotum narrow, impressed and ridged at middle, with narrow sutures separating it from pro- and metanotum; metanotum and first two abdominal tergites completely fused, inflated, with the front pair of protuberances more widely separated than posterior pair. Abdominal tergites III to VI (inclusive) completely fused, smooth, inflated, with impressed areas but without raised ridges, not sculptured, with dorsal scent gland raised and prominent. Connexival segment I and II fused, the others separated by the usual sutures. Sterna fused, without impression or ridges. Abdominal ventrites I, II and III fused together with metasternum, the rest separated by transverse sutures.

Type (female), Andrambovato, Madagascar, Jan. 8, 1952, collected by Capt. V. J. Tipton, U.S. National Museum. The species is named in honor of the collector. The rostrum is 1.25 mm. long in *tiptoni* and only 0.80 mm. long in *E. testudinatus* Usinger.

***Aglaocoris vicinus*, sp. new**

Large, broad, subquadrate, widest just back of the middle of abdomen. Length 6.25 mm. (male) and 6.70 mm. (female); width, 3.30 mm. (male) and 4.00 mm. (female).

Head rugulose, with longitudinal carinae, slightly wider across eyes (1.50 mm.) than median length (1.35 mm.), without tubercle or protuberance just back of each eye, strongly narrowed behind eyes to neck; eyes moderately large, each placed on outer end of a short, thick stalk; lateral shelves on practically same horizontal level as median, longitudinal part of head, width of latter on vertex nearly same as that of one shelf; antenniferous tubercles large, subconical, divergent; tylus fairly wide, tumid subapically; juga thin, with dorsal edge on lower level than that of tylus, surpassing tylus, there short, subcylindrical and divergent; neck short, rounded. Labial sulcus broad, fairly deep, barely reaching to neck; labium testaceous, just reaching to end of sulcus. Antennae finely granulate, 2.50 mm. long; segment I stout, feebly bent, exceeding juga by two-thirds of its length; IV subclavate, beset with pale hairs on apex; measurements—I, 56; II, 32; III, 4; IV, 35.

Thorax densely, deeply, rugulosely pitted; collar short, not inserted, with the transverse furrow just in front of anterior margin of pronotum; median longitudinal ridge widened posteriorly, with dorsal surface rugulose and similarly sculptured as rest of thoracic surface, arising at base of pronotum and then extending posteriorly on second abdominal tergite; pronotum distinctly narrower than mesonotum, with outer edge on each side bifid, slightly projecting in front at anterolateral angles, more than three times as wide as median length; mesonotum wider and slightly longer than pronotum, fused with pro- and mesonotum separating sutures plainly indicated; mesonotum fused also with first three abdominal tergites. Orificial canal nearly upright, sinuate. Abdomen with dorsal tergites III, IV, V and VI fused into one solid plate, sculptured with the usual narrow ridges and impressions; connexival segment I and II fused, others distinctly differentiated from one another and also from

dorsal tergites. Body beneath with all sterna and first three ventrites fused together, other ventrites distinguishable from one another by transverse furrows.

Spiracles II, III and IV ventral, each progressively anteriorly slightly farther removed from outer edge of connexiva; V subventral, VI, VII and VIII lateral, plainly visible from dorsal aspect, VIII (genital) situated on apical end of small, rounded, posterior process. Legs rather short, with tibiae tending to be rather pale. Male ventrite VII beneath (one on each side) with a fairly large, smooth, rounded, bottle-like, process with constricted neck and directed downward. This process is found only in the male and is present in the two species described herein as well as in the three other known species in the genus. As the processes vary in size and shape in different species, the structures are of generic and specific importance in identification.

Type (male), *allotype* (female) and 1 *paratype*, Guadeloupe, W. I., Drake Collection (U.S.N.M.).

Separated from it congeners by antennal measurements, lack of tubercle on lateral side back of each eye, lateral projection of pro- and mesonotum and the very large process on the inferior side of ventrite VII (one on each side) which is pointed almost directly downward.

***Aglaocoris clarkei*, new sp.**

Large, rectangular, body very little narrowed anteriorly, reddish ferruginous, with rather small lobes on sides of pro- and mesonotum and very small lobes on abdominal tergites V, VI and VII. Head, antennae and legs with numerous, long, pale, stiff, setalike hairs; eyes small, prominently stalked. Spiracles II, III and IV ventral, not visible from above, each anteriorly farther removed from outer edge of segment; V, VI and lateral and VIII (genital) placed on apical end of small projection, all visible dorsally. Length, 6.50 mm.; width, 3.00 mm.

Head subtriangular, shining, nearly smooth, with little sculpturing in the form of ridges. Width across eyes (1.40 mm.) and median length subequal; juga narrow, slightly surpassing tylus in the form of divergent, fingerlike projections; tylus rather narrow, blunt at apex, longitudinally convex, higher than juga; eyes small, placed on outer end of moderately long, slender, rounded stalks; median longitudinal part of head scarcely more elevated than and as wide as a shelf (not including eye-stalks); neck narrow, smooth, with a small tubercle back of each eye. Labial sulcus very wide, deep, barely reaching to neck; labium barely attaining apex of sulcus. Antennae 2.02 mm. long; segment I stout, extending about one-half its length beyond apices of juga; measurements—I, 60; II, 30; III, 34; IV, 28. Antenniferous tubercles stout, divergent, terminating in a fingerlike projection.

Thorax with divisions and first two abdominal tergites all fused together, rather finely closely sculptured, with broad median ridge extending from base of pronotum to fused tergites, with sutures in front of and behind metasternum plainly visible, width across pronotal lobes 2.00 mm. Abdominal tergites III to VI (inclusive) fused into a single plate, sculptured, with dorsal scent gland present, concolorous with tergites. Connexival segments and segmentation on underside of body as in other members of the genus.

Type (female), Fresh Water Lake, Dominica, B. W. I., March 26,

1956, J. F. G. Clarke, U.S. National Museum. Named in honor of Dr. Clarke, who has netted a large number of rare and interesting insects in many areas of the world.

***Aglaocoris invisus*, new sp.**

Large, wide, rectangular, dark ferrugineous. Length 5.40 mm. (male) and 5.75 mm. (female); width 2.76 mm. (male) and 3.15 mm. (female).

Head 1.25 mm. wide across eyes, median length subequal to width across eyes, moderately regulose; juga thin, feebly surpassing tylus, bluntly rounded in front; tylus more elevated than juga, with a small rounded tubercle up on top of subapical elevation; antenniferous tubercles large, subconical, divergent; eyes rather small, placed on outer end of rather small, rounded stalks; lateral shelves (not including eye-stalks) about as wide as and on a slightly lower level than median longitudinal part of head, transversely regulose, with a very low tubercle on each lateral side behind eye-stalk, rapidly narrowed behind eyes to neck; neck with a small tubercle on each lateral side, narrow, rounded. Labial sulcus rather deep, wide, barely extending to neck; labium extending to end of sulcus. Antennae 1.70 mm. long, finely granulate; segment I moderately incrassate, feebly bent; IV subclavate, with tip hairy; measurements—I, 52; II, 22; III, 31; IV, 30.

Thorax above closely finely rugulose, the median ridge low, broad and widened posteriorly; metanotum without indication of sutures between it and fused abdominal tergites; pronotum distinctly narrower than mesonotum, more than three times as wide at base as median length, with outer margin slightly rounded, slightly produced anteriorly at anterolateral angles; mesonotum fused with pro- and metanotum but with separating suture plainly indicated, with outer margins moderately lobately produced. Abdomen with dorsal tergites III, IV, V and VI fused into one solid plate, with the usual sculptured areas. Body beneath with sterna and first three ventrites fused, the rest of the ventrites with transverse sutures present. Dorsal connexival segments I and II fused together, the rest of the segments clearly distinguished. Spiracles II, III and IV ventral, each progressively anteriorly farther removed from outer edge of connexiva; V submarginal (ventral); VI, VII and VIII marginal, visible from above, the latter situated on apical end of a small, fingerlike, posteriorly-directed projection. Male ventral processes (one on each side of ventrite VII) rather small, directed almost posteriorly, with apex subglobose, without bottlelike neck.

Type (male) and *allotype* (female), Guadeloupe Island, West Indies. *Paratype*: 1 female, same data as type; Drake Collection (U.S.N.M.).

Allied to *A. vicinus*, n. sp. but readily separated from it by its slightly smaller size, measurements of antennal segments, rounded outer margins of pronotum. The male processes on the underside of abdominal tergite VII are also very much smaller, without constricted neck and pointed almost directly posteriorly.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A TRIO OF NEW BIRDS FROM TROPICAL ASIA

BY H. G. DEIGNAN*

An owl, a bulbul, and a spider-hunter from southeastern Asia have proved to require subspecific separation. For the loan of material essential to this study I am indebted to the authorities of the Sarawak Museum (Kuching) and of the British Museum (Nat. Hist.), and for comments on specimens not personally examined to Mrs. B. P. Hall of the British Museum.

I.

In a review of the races of the collared scops owl (Auk, vol. 67, 1950, p. 197), the author left the population of Borneo nameless, with the suggestion that it might eventually be shown to represent a valid subspecies. Through the interest of the authorities of the Sarawak Museum, I have before me 17 new specimens of this population, to add to two already in the U. S. National Museum, and it now becomes possible to give nomenclatorial recognition to the Bornean bird.

Since the new race needs comparison primarily with the well-known *Otus asio lempiji* of Java, it will be necessary to review the characters of that form, which occurs in three color phases: 1) a "gray" one, with the upper parts gray-brown, marked with grayish white or buffy gray, and the under parts gray or buffy gray; 2) an "intermediate" one, with the upper parts similar but more nigrescent, and the under parts grayish buff; 3) a "red" one, with the upper parts dull rufescent brown, marked with pale buff, and the under parts dull ferruginous buff.

The new race may be called

Otus asio lemurum, subsp. nov.

Type: U. S. Nat. Mus. No. 461686, adult male, collected at Kanowit, Sarawak, on April 29, 1952, by Alastair Morrison; original number 1/52; presented by the Sarawak Museum.

Diagnosis: In its "red" (and apparently most frequent) phase, nearest Phase 3 of *lempiji*, but differing by having the upper parts ferruginous brown, marked with ferruginous buff, and the under parts ferruginous; in its "intermediate" phase, with the upper parts similar to those of the "red" phase, but more nigrescent, and marked with less vivid buff, the under parts similar to those of the "red" phase, but slightly duller in tone; in its "gray" phase (apparently the least frequent), variably intermediate between the Phases 2 and 3 of *lempiji*.

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Range: Borneo, and probably the Northern Natuna Islands.

Remarks: As type specimen I have selected an average example of the "red" phase.

II.

The race of the bulbul, *Microscelis flava*, inhabiting southern Annam, while strikingly different from the gray-backed, black-capped race *bourdellei* of regions just to the North, is outwardly so similar to *davisoni* of central Tenasserim as to have long been confused with it. The Annamese bird is, however, separable, and I name it

Microscelis flava *remotum*, subsp. nov.

Type: U. S. Nat. Mus. No. 360982, adult female, collected at the Lang Bian Peaks, southern Annam, in December 1939, by Joseph F. C. Rock; original number 1133.

Diagnosis: Nearest *M. fl. davisoni*, but differing in freshly moulted adults by having the upper tail coverts much more strongly washed with olive green, and by having the outer edges of the inner primaries, the secondaries, and their coverts, and also of the rectrices, slightly more broadly margined with an outwardly more golden olive-yellow.

Range: Southern Annam (Lang Bian Plateau) and probably southern Laos (Boloven Plateau).

III.

Arachnothera chrysogenys harrissoni, subsp. nov.

Type: U. S. Nat. Mus. No. 182609, adult male, collected at Labuan Kelambu [lat. 1°15' N., long. 118°39' E.], Borneo, on June 24, 1913, by Harry C. Raven; original number 869.

Diagnosis: Separable from *A. chr. chrysogenys* of Java, Sumatra, the Malay Peninsula, and probably western Borneo, by having the mantle almost devoid of golden suffusion, so that it is nearly concolorous with the crown, and the exposed portions of the closed wings similarly much less strongly suffused with golden bronze; thus, in its upper aspect, the new form is generally lighter and duller than the nominate race.

Range: Known only from the type locality (11 adult specimens).

PROCEEDINGS
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AMERICAN BATS OF THE GENUS *MIMON*

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The large, leaf-nosed bat, *Mimon bennetti*, was described from South America in 1836. The species was erroneously included in the list of North American mammals by True (1885), and Miller (1907) gave its range as "South America north to southern Mexico." Subsequent check-lists retained this concept of the range of the species, although specimens of *Mimon* from Cozumel Island, Yucatan, Mexico, were described as a new species, *M. cozumelae*, in 1914. Other than the six specimens upon which the name *cozumelae* was based, no specimens of *Mimon* were reported from North America until 1941 when Sanborn recorded two specimens from the mainland of Yucatan, under the name *bennettii*.

Another *Mimon* was recorded from Yucatan by Hatt and Villa (1950). These authors pointed out that, on the basis of geographic probability, the Yucatan specimens recorded by Sanborn, as well as their own specimens, should be referable to *cozumelae* rather than *bennetti*. They compared the mainland specimens with four topotypes of *cozumelae* and found only minor differences.

Between 1946 and 1949 I obtained ten specimens of *Mimon* from central and southern Veracruz, Mexico. These specimens and four topotypes of *cozumelae* were kindly made available to me by Rollin H. Baker, of the University of Kansas Museum of Natural History. No essential differences were found between the two series. David H. Johnson, of the United States National Museum, generously loaned me what appears to be the only specimen of true *M. bennetti* in any North American museum. This bat, from Ypanema, Sao Paulo, Brazil (fixed as the type locality of *bennetti* by Hershkovitz, 1951) differs markedly from the Mexican specimens in a number of ways. The differences are not of such magnitude, however, as to preclude the possibility of intergradation should the range of *Mimon* be continuous from South America to Mexico. Nevertheless, there is now a gap in the known range of the genus that extends from Brazil to Mexico (George G. Goodwin, of the American Museum of Natural History, informs me that the alleged *Mimon* from Venezuela, in the American Museum, is actually a *Chrotopterus*). Until intergradation between the two forms is actually established, the most conservative treatment seems to be retention of both *M. bennetti* and *M. cozumelae* at full specific rank.

Mimon bennetti (Gray)

Phyllostoma bennetti Gray, Mag. Zool., Bot., 2, 1838:488.

Type locality.—South America. Fixed at Ypanema, Sao Paulo, Brazil, by Hershkovitz (1951).

Range.—Apparently known certainly only from Brazil.

Description.—A relatively small, very dark *Mimon*, with a distinct swelling, and posterior extension, of the occipital region of the skull. Large whitish areas are lacking at the bases of the ears. Measurements of a specimen from Ypanema are: total length, 79 mm.; length of tail, 14; length of hind foot, 15; height of ear from notch, 35; length of forearm, 52.6; greatest length of skull, 24.9; condylobasal length of skull, 22.2; length of upper tooth row (complete), 9.8; braincase breadth, 9.1; interorbital breadth, 4.8; mastoid breadth, 10.4; breadth across third upper molars, 9.4.

Mimon cozumelae Goldman

Mimon cozumelae Goldman, Proc. Biol. Soc. Washington, 27, 1914: 75.

Type locality.—Cozumel Island, Yucatan, Mexico.

Range.—Known only from the states of Yucatan and Veracruz, Mexico. Almost certainly present in Guatemala also, for specimens have been taken near the border of that country, in Veracruz.

Description.—Larger and paler in color than *Mimon bennetti*, with whitish areas at the bases of ears, and skull with much smaller swelling in occipital region. Mean measurements of ten adults from Veracruz, Mexico, are: total length, 90 mm.; length of tail, 20; length of hind foot, 16; height of ear from notch, 35; length of forearm, 54.9; greatest length of skull, 26.2; condylobasal length, 23.0; length of upper tooth row (complete), 10.2; braincase breadth, 10.1; interorbital breadth, 4.6; mastoid breadth, 11.9; breadth across third upper molars, 9.4.

The apparent gap between the ranges of *M. bennetti* and *M. cozumelae* includes all of northern South American and Central America. Specimens from this area are needed before the true relationships of the present nominal species can be understood. The following observations, based on ten of the twenty specimens known from North America, may be helpful to collectors working in areas where critical specimens might occur.

Museum specimens of *Chrotopterus* have been confused with *Mimon* but *Chrotopterus* is so much larger (total length about 120 mm., rather than 90 mm.) that it can scarcely be mistaken for *Mimon* in the field. *Mimon* is, however, so similar to *Phyllostomus discolor* in size, color and general appearance, that close scrutiny is required for identification. The two may most rapidly be separated by the shape of the tips of the ears: pointed in *Mimon* but rounded in *Phyllostomus*. *Phyllostomus discolor* and *Mimon* may be found side-by-side, in the same cave. *Mimon* is rarely seen in flight, but when seen can be identified by its silent, swooping flight and extremely long interfemoral membrane. The only specimen I shot in flight was at a grove of orange trees where the half-spoiled fruit hung on the trees. Several bats, presumably all *Mimon*, were seen about the oranges. They may have been eating the fruit, fermented juice, or insects stupified by the juice.

Mimon seems to be only moderately social. The smallest number ever seen in a cave was two; the greatest number four. Caves inhabited were all similar: deep, dark, damp holes in limestone cliffs where the

rock was everywhere covered with a film of moisture. Only *Mimon* and *Phyllostomus* were ever taken in such habitat. The feces of *Mimon* are a white liquid that leaves calcareous smears similar to the droppings of owls and other predacious birds. No traces of food were ever found in caves inhabited by *Mimon*, but the bats are presumably carnivorous.

In their caves the bats are alert and eye the light as a collector enters their retreat. Unless actually molested, however, they are not apt to take flight. On one occasion four bats clinging close together to the roof of a cave were all knocked down with a stick, one at a time, without the others taking flight. One of those knocked down escaped by swimming into a narrow crevice in the water-filled floor of the cave. The three taken included two *Mimon* and one *Phyllostomus*. When individuals of *Mimon* do fly, however, they remain extremely shy, retreating ahead of the collector as he approaches without permitting a shot.

The caves inhabited by *Mimon* were almost always below the level of the surface of the ground and often had small entrances. No traces of the bats were found until the actual chamber in which they were living was entered. It was sometimes necessary to persist in exploring all chambers of caves that appeared too damp to be suitable for bats, in order to discover *Mimon*.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FIFTEEN NEW THYSANOPTERA FROM THE
UNITED STATES

BY J. DOUGLAS HOOD

The great majority of the species described in this paper were taken during the summer of 1955, in the region of the Southwestern Research Station of the American Museum of Natural History, near Portal, Arizona, in the Chiricahua Mountains. Even in a preliminary paper as brief as this, space must be taken to mention and thank Dr. Mont A. Cazier and Dr. Willis J. Gertsch, of the American Museum staff, and Mr. John Gordon Anderson, Foreman at the station, who were primarily responsible for the success of the undertaking; and I must acknowledge, too, the hospitality of the William C. Miller family of ranchers in the Peloncillo Mountains, close by in New Mexico, whose home became a sort of subsidiary headquarters in the work of collecting. The types of the new species are in my collection.

*Scirtothrips*¹ *clivicola*, sp. nov.

Very similar to *brevipennis* and *taxodii* in that the abdominal terga and sterna are without dark cross-lines and the wings very short; differing from both in the paler and less orange-colored body and in having three instead of (normally) four setae along the front margin of anal lobe of fore wings; differing from the former in the narrower head and from the latter most conspicuously in the less protruding eyes, which are proportionately closer to the base of head.

♀ (macropterous).—Length about 0.8 mm. (distended, 0.9 mm.). Color pale yellow, rather than orange-yellow, prothorax not shaded; antennae with segment I nearly colorless, II without orange pigment, it and III-VIII pale yellowish gray, III-V shaded apically, IV and V with pedicels dark; ocellar pigmentation orange-red; legs concolorous with body, very lightly shaded with gray; fore wings nearly colorless, except for the orange-pigmented veins. Head 86 μ long, 120 across eyes, 114 across cheeks, 102 across base; eyes not noticeably protruding, dorsally 51 long, 34 wide, interval 53, distance from base of head 22; pronotum 80 long, 140 wide, sculpture normal, setae pale gray, seta at

¹*Scirtothrips longipennis* (Bagnall) was mistakenly placed by Morison (Lond. Nat., 1947, No. 27, Suppl., p. 49) in the genus *Sericothrips*. Hood's placement in 1914 of this species in *Scirtothrips* (Proc. Ent. Soc. Wash., 16(1):37,40) has been accepted by all later workers. The species is hereby returned to *Scirtothrips*.

posterior angles 31; mesothorax 145 across anterior angles, greatest width 167; fore wings 497, chaetotaxy normal; abdomen 206 wide at segment IV, setae on IX and X darker than integument, 40-45. Antennal segments: I 16 (21), II 34 (24), III 39 (17), IV 34 (17), V 36 (17), VI 37 (15), VII 7 (8), VIII 10 (5).

ARIZONA: Chiricahua Mts., August 31, 1955, J.D.H., 3 ♀♀ (including holotype), swept from low grasses and herbs.

*Sericothrips*² *pubescens*, sp. nov.

Very similar to *cingulatus* in having the first eight abdominal terga clothed with fine microtrichia (even medially) and in the nearly yellow fourth and fifth segments; but with the metanotum completely covered with minute microtrichia, pronotum subreticulate (rather than transversely striate) in front of blotch, pronotal setae pale and shorter (those at posterior angles respectively 15 and 23 μ long, instead of about 20 and 41), wing-pads shorter (92 μ , rather than about 130) and with fewer and shorter setae, median pair of setae on abdominal tergum I about as far apart as the homologous pair on II (instead of much closer together than that pair) and situated external to the inner of two pairs of pores (instead of internal to a single pair), and with the legs wholly yellow save for a slight shading on the hind femora (instead of all femora largely dark brown).

♀ (brachypterous).—Length about 1.1 mm. (distended, 1.2 mm.). Color dark brown, with abdominal segments IV and V nearly white, VI and VIII-X pale brown, VI pale basally; metathorax yellowish in posterior half; pronotal blotch scarcely darkened except marginally; antennal segments I-III yellow, III shaded lightly in about apical half, IV-VIII dark gray brown, IV and V briefly paler just beyond pedicel; legs yellow, hind femora lightly shaded with brown on outer surface near tip; wing-pads colorless. Head 113 μ long, 174 across eyes, 156 across cheeks, the latter slightly concave, surface of head striate as usual; mouth-cone short and rounded, extending about 105 μ beyond posterior dorsal margin of head; eyes 72 μ long, 51 wide, 72 apart; pronotum 133 long, 238 wide, front margin of blotch indicated by a brown, broadly V-shaped line whose point is only very slightly in advance of middle of pronotum, sculpture in front of blotch subreticulate, with the lines 6-7 μ apart, those within the blotch area much closer together; mesothorax 225 across anterior angles, greatest width 238; fore wings 92, their longest setae 23; abdomen 332 wide at segment IV, IX with setae I-III 50-57, X with seta I 54, II 60. Antennal segments: I 30 (32), II 44 (29), III 73 (19), IV 59-63 (19), V 48 (19), VI 57 (16), VII 13 (7), VIII 18 (5).

NEW YORK: Apulia Station, October 11, 1940, Dr. F. Reese Nevin and J.D.H., 1 ♀ (holotype), from grass.

²It might be well to point out, in connection with Hartwig's key to the known species of this genus (Ent. Mem., Dept. Agr., Pretoria, 2(11):402, 1952) that the genus *Sericothrips* Haliday was described in 1836, rather than in 1835; that the species which he calls *Sericothrips apteris* Daniel was referred to *Anaphothrips* in 1926 by Moulton (Pan-Pac. Ent., 3(1):23) and assigned as a synonym of *A. secticornis* (Trybom) in 1927 by Hood (Pan-Pac. Ent., 3(4):173); and that the species which Hartwig calls *Sericothrips reticulatus* Moulton was placed in a new subgenus of *Anaphothrips*—now recognized as a distinct genus—in 1926 by Moulton (Pan-Pac. Ent., 3(1):22), who referred to it as *Anaphothrips (Prasoponaphothrips) reticulatus*.

Sericothrips ephedrae, sp. nov.

Allied to *moultoni* and *chrysothamni*, but differing from both in having abdominal segments VII-X largely yellow, IX and X wholly so.

♀ (macropterous).—Length about 1.1 mm. (distended, 1.2 mm.). Head brown in ocellar area, in front, and along occipital apodeme, remainder yellow; pronotum with front margin of blotch brown and unbroken, and with three or four coalescing foveal dark spots; pterothorax with bright orange internal pigmentation, marked with gray-brown; abdomen bright yellow in segments IX and X, yellowish elsewhere, with prominent, complete, blackish brown antecostal lines on terga II-VII, that on VIII confined to median third or more, shaded with gray behind these lines, more broadly and darkly so near sides of body; antennae with segment I nearly colorless, II dark yellowish brown, III-V pale brownish gray, III with narrow dark ring at tip of pedicel, its narrowed basal portion beyond, as well as apex, dark gray, IV and V with pedicels and apical two-fifths dark, VI-VIII concolorous with tip of V; legs yellow, but with all femora and tibiae heavily shaded with brown in middle third or more; fore wings pale, slightly darkened in scale and adjoining part of membrane, with a dark band occupying apical half of second fifth.

Head 113 μ long, 162 across eyes, 153 across cheeks, striate in occipital area; mouth-cone short, extending about 73 μ beyond posterior dorsal margin of head; eyes about 71 long, 47 wide, and 77 apart; pronotum 116 long, 181 wide, striae in front of blotch about twice as far apart as those within it, outer seta at posterior angles 10, inner 42 and light brown, all others colorless; mesothorax 185 across anterior angles, greatest width 225; fore wings 714, midcostal setae 39, one accessory seta near tip behind vein, the latter with 3 + 15-18; abdomen 258 wide at segment IV, terga II-V not pubescent medially, comb on VI interrupted at middle, IX with seta I 56, II 47, III 50, X with I and II 63. Antennal segments: I 22 (27), II 40 (27), III 50 (20), IV 49 (18), V 40 (16-17), VI 45 (16), VII 9 (6-7), VIII 13-14 (5).

♂ (macropterous).—Length about 0.8 mm. (distended, 0.9 mm.). Color and general structure much as in female.

NEW MEXICO: Rodeo, August 8, 1955, J.D.H., 12 ♀♀ (including holotype).—ARIZONA: about 8 mi. S.W. of Rodeo, N.M., August 9, 1955, J.D.H., 10 ♀♀ and 1 ♂ (allotype). All specimens were taken from *Ephedra trifurca*.

Sericothrips catenatus, sp. nov.

Resembling *desertorum* in having abdominal terga II-V not pilose medially in the vicinity of the antecostal lines, the fore wings with one accessory seta near tip behind the vein, and the distinctly striate meso- and metanota; but differing in the pale yellow color of the body and legs, shaded pronotal foveae, paired gray spots at lateral fourths of terga II-VII, colorless antecostal lines between these spots, color of the fore wings, slenderer antennae, and the very long mouth-cone; resembling *albus* in this last character, but that species apparently lacks shading in the pronotal foveae and abdominal markings.

♀ (macropterous).—Length about 0.9 mm. (distended, 1.04 mm.). Color pale yellow (distinctly whitish) in body and legs; pronotum

without blotch but with four pairs of foveal gray spots, mesonotum with a pair of well-separated similar spots, metanotum with a pair of larger touching spots, abdomen spotted as noted above; antennae concolorous with head in segments I and II, the latter segment very slightly darker, III-V similarly pale, III with narrow dark ring at tip of pedicel, the narrowed basal portion of the part beyond pedicel, as well as apex, gray, IV and V with pedicels darkened, IV shading in apical two-fifths to dark gray at tip, V abruptly gray in apical two-fifths and darker at tip, VI-VIII dark gray; fore wings lightly shaded in scale and adjoining area of membrane of wing, and with a more distinct gray spot occupying about basal half of second fourth.

Head 73 μ long, 127 across eyes, 117 across cheeks, striate in occipital area; mouth-cone very long, extending 146 μ beyond posterior dorsal margin of head, well onto mesosternum; maxillary palpi long, their three segments 26, 13, and 26-27 μ long, respectively; eyes about 56 μ long, 36 wide, and 56 apart; pronotum 96 long, 139 wide, striae in front of blotch area transverse, about twice as far apart as those at middle of pronotum, outer seta at posterior angles 11, inner 45 and light brown, all others colorless; mesothorax 152 across anterior angles, greatest width 186; fore wings 609, midcostal setae 38, one accessory seta near tip behind vein, the latter with 3 + 18; abdomen 237 wide at segment IV, comb on VI broadly interrupted at middle, IX with seta I 47, II 40, III 43, X with I and II 50. Antennal segments: I 20 (23), II 34 (23), III 50 (17), IV 45 (16), V 40 (15), VI 49 (13), VII 10 (6), VIII 13-14 (4).

ARIZONA: Chiricahua Mts., July 22, 1955, J.D.H., 13 ♀♀ (including holotype) and 1 ♂ (allotype); Pajarita Mts. (near Nogales), August 31, 1927, J.D.H., 8 ♀♀. All specimens were taken from desert shrubs.

Sericothrips desertorum, sp. nov.

Resembling *setosus* in having the antecostal lines on abdominal terga II-VII dark and complete, the more basal terga not pilose medially in the vicinity of these lines, the fore wings with one accessory seta near tip behind the vein, and the mouth-cone short; but differing in the orange-pigmented pterothorax, the distinctly striate meso- and metanota, and the shorter setae on pronotum and fore wings.

♀ (macropterous).—Length about 1.0 mm. (distended, 1.1 mm.). Yellow, excepting the heavily orange-pigmented pterothorax, pronotum without darkened blotch; abdomen with brown antecostal lines on terga II-VII; antennae concolorous with head in segments I and II, III-V grayish yellow, III with narrow dark ring at tip of pedicel, the narrowed basal portion of the part beyond pedicel, as well as apex, gray, IV and V with pedicels darkened, IV shading in apical two-fifths to dark gray at tip, V abruptly dark gray in apical two-fifths and darker at tip, VI-VIII dark gray; legs yellow; fore wings nearly uniform pale yellowish.

Head 94 μ long, 147 across eyes, 138 across cheeks, striate in occipital area; mouth-cone short, extending about to middle of prosternum; eyes about 61 μ long, approximately 40 wide, and 66 apart; pronotum 102 long, 172 wide, striae in front of blotch area close and transverse, though farther apart than those at middle of pronotum, outer seta at posterior angles about 14, inner 38 and light brown, all others colorless; meso

thorax 172 across anterior angles, greatest width 217; fore wings 650, midcostal setae 33, one accessory seta near tip behind vein, the latter with $3 + 19$; abdomen 263 wide at segment IV, terga II-V not pubescent medially in the vicinity of antecostal line, comb on VI broadly interrupted at middle, IX with seta I 50, II 46, III 44, X with I and II 53-55. Antennal segments: I 20 (24), II 40 (26), III 49 (19), IV 41 (18), V 36 (17), VI 40 (16), VII 10 (6-7), VIII 13 (5).

NEW MEXICO: Peloncillo Mts., June 30, 1955, J.D.H., 1 ♀ from a desert shrub.

Sericothrips baileyi, sp. nov.

Resembling *trifasciatus*³ in having the pale distal half of fore wings with a darker band occupying approximately its middle third, tergum VI of abdomen without comb medially, and the occipital apodeme much closer to eyes than to base of head; but with antennal segments I and II scarcely darker than III, abdominal terga II-III and VII-VIII not darkened, and fore wings with only one accessory seta near tip, behind the vein.

♀ (macropterous).—Length about 1.2 mm. (distended, 1.4 mm.). Head brown in ocellar area, along occipital apodeme, remainder yellow with slight shading; pronotum with front margin of blotch brown and unbroken, and with three or four coalescing foveal dark spots, remainder yellow; pterothorax yellow, with brown spots; abdomen yellow, with prominent dark antecostal lines on terga II-VII, shaded behind these lines, more broadly so in lateral thirds and in median third of VII, VIII clouded in basal half, pleurae dark; antennae with segment I nearly colorless, II pale brown but nearly colorless in pedicel and subapically, III and IV pale brownish gray, III with narrow dark ring at tip of pedicel, its narrowed basal portion beyond, as well as apex, dark gray, IV and V with pedicel and apical half darkened, V darker throughout than IV, VI-VIII dark gray; legs yellow, shaded with brown or gray, fore coxae darker than the others, fore femora clouded at middle of outer surface, hind femora darkened in apical third except for extreme tip, middle femora and all tibiae darkened in middle half or third, tarsi yellow; fore wings clouded in scale, gray in second fourth, this band followed by a somewhat paler band midway between it and tip of wing.

Head 115 μ long, 156 across eyes, 150 across cheeks, striate in occipital area; mouth-cone short, extending about to middle of prosternum; eyes about 67 μ long, 43 wide, and 67 apart; pronotum 125 long, 195 wide, striae in front of blotch about twice as far apart as those within it, outer seta at posterior angles about 10, inner 46 and light brown, all others colorless; mesothorax 185 across anterior angles, greatest width 245; fore wings 742, midcostal setae 45, one accessory seta near tip behind vein, the latter with $3 + 16-19$; abdomen 318 wide at segment IV, terga II-V pubescent medially in the vicinity of antecostal line, comb on VI interrupted at middle, IX with seta I 57, II 52, III 51, X with I 64, II 58. Antennal segments: I 21 (26), II 40 (28), III 57 (21), IV 51 (19), V 46 (16), VI 50 (16), VII 10 (7), VIII 13 (5).

³*Sericothrips trifasciatus* (Ashmead), comb. nov. (*Thrips trifasciatus* Ashmead, Ins. Life, 7(1):27, 1894.) Watson suggested (Bull. 168, Fla. Agr. Exp. Sta., p. 44, 1923) that this might be *Franklinothrips vespiiformis*, but scarcely a word or phrase of Ashmead's description could be applied to that species.

♂ (macropterous).—Length about 0.9 mm. (distended, 1.04 mm.). Color and general structure much as in female.

CALIFORNIA: Westley, September 6, 1935, Dr. S. F. Bailey, 5 ♀♀ (including holotype) and 1 ♂ (allotype), from leaves of milkweed.

Plesiothrips pallidipennis, sp. nov.

Closely allied to *perplexus*⁴, but with abdomen never largely yellow; legs darker, with femora brown; wings pale, with slight cloud at basal third; segment IV of antennae with distinct ring-joint at base in ♀, IV much shorter than V in ♂.

♀ (macropterous).—Length about 1.3 mm. (distended, 1.6mm.). Color blackish brown, with bright red internal pigmentation in thorax; head and tip of abdomen darkest, intermediate abdominal segments paler; antennae with segments I, II, and V-VII about concolorous with head, III and IV grayish yellow, III shaded apically, IV darker and sometimes nearly concolorous with V; femora brown, yellowish basally, tibiae and tarsi yellow, or the former shaded with brown, especially basally; fore wings nearly colorless, somewhat yellowish, sometimes with a slight brownish cloud at basal third. Head 141 μ long, 126 across eyes, 114 just behind eyes, 122 across cheeks, and 104 across base, thoroughly typical in sculpture and chaetotaxy; eyes 61 long, 34 wide, and 58 apart; pronotum 135 long, 152 wide, smooth except for faint striae near front and hind margins, setae at posterior angles pale brown, each 50 μ ; mesothorax 174 across anterior angles, greatest width 190; fore wings slender, nearly straight, about 19 times as long as wide; abdomen 237 at segment IV, setae on IX respectively 96, 136, and 133, on X 128. Antennal segments: I 26 (32), II 32 (24), III 42 (21), IV 52 (19), V 36 (16), VI 54 (17), VII 27 (7).

♂ (macropterous).—Length about 0.9 mm. (distended, 1.1 mm.). Typical in structure and like female in color and structure, except for the dimorphic antennae; antennal segments IV and V with ring-joints; I 23 (31), II 30 (24), III 35 (22), IV 50 (21), V 82 (18), VI 91 (19), VII 15 (4).

ARIZONA: Chiricahua Mts., July 12-August 14, 1955, J.D.H., 5 ♀♀ (including holotype taken August 4) and 36 ♂♂ (including allotype taken August 4), from grasses.

NEW MEXICO: Peloncillo Mts., August 5, 1955, J.D.H., 1 ♂, from *Lepidium Thurberi*.

Eurythrips genarum, sp. nov.

Closely related to *ampliventralis* and *conjunctus*, but with two sense-cones on outer surface of segment III of antennae, posterior facet of eyes largely or wholly behind notch in cheeks at eyes, wing-pads of brachypterous form small and with only one seta, and glandular area on sternum VIII of ♂ occupying less than one-third the length of segment, traversing it just behind middle, ends curved backwards.

♀ (brachypterous).—Length about 1.4 mm. (fully distended, 1.72 mm.). Color of head bright yellow, slightly shaded with brown along cheeks and in ocellar area; thorax yellowish brown, pterothorax darker,

⁴*Plesiothrips perplexus* (Beach); synonym: *Thrips panicus* Moulton, Fla. Ent., 13:61, 1929. New synonymy.

abdomen shading to blackish brown apically, tube paler at base and apically; legs yellow; antennae yellow in segments I and II and base of III, remainder brown, darker apically. Head 180 μ long, 118 across eyes, 118 across cheeks just behind notch, 140 across cheeks, 131 in front of basal collar, across head-process 74, dorsal surface faintly reticulate just in front of occipital line; postocular setae 54, interval 84, dilated at tip. Eyes 43, width 36, interval 47. Antennal segments: I 40 (36), II 51 (31), III 56 (30), IV 50 (29), V 50 (28), VI 50 (27), VII 37 (22), VIII 26 (13); sense-cones on IV 1 (2); pedicel of VII short, not at all comparable with that of VI, broadened at base, not quite twice as wide as latter. Prothorax normal, major setae dilated like postoculars, antero-angulars and midlaterals 44 46, epimerals 55, postero-marginals 51, coxals 33; fore wings 37, wing setae 37; fore tarsal tooth minute. Abdomen normal to group, most setae dilated, setae I and II on segment IX 95-100 μ , tapering rapidly at tip to a sharp point; tube 115, across base 67, at tip 33, terminal setae 90.

♂ (brachypterous).—Length about 1.1 mm. (fully distended, 1.3 mm.). Color and structure almost identical with that of ♀.

VIRGINIA: Fairfax Co., January 5, 1941, Lincoln C. Pettit, 6 ♀♀ (including holotype) and 1 ♂ (allotype); Falls Church, March 4, 1941, L. C. P., 2 ♀♀. Both lots were from *Andropogon*.

*Karnyothrips*⁵ *medialis*, sp. nov.

♀ (brachypterous).—Bicolorous, chestnut-brown and yellow; legs (including all coxae), pterothorax, and first abdominal segment, bright yellow; second abdominal segment yellow laterally, remainder of body brown, with head darker than prothorax, abdomen somewhat darker apically; antennae with segment I darkest and concolorous with head, II yellow but shaded along sides and in pedicel, III and IV yellow but tinged with brown, V-VIII successively slightly darker. Length about 1.4 mm. (distended, 1.7 mm.). Head, total length 0.177, width across eyes 0.120, just behind eyes 0.116, across cheeks 0.123, near base 0.114; eyes, dorsal length 0.050, width 0.029, interval 0.059; postocular setae slightly dilated apically, 26 μ long, 105 apart, and about 18 from eyes; prothorax smooth, 117 μ long, 197 across coxae, epimera not fused with notum, antero-marginal and midlateral setae minute and pointed, the others slightly dilated, antero-angulars 20, epimerals 48, postero-marginals 34, coxals 20; mesothorax 192 across anterior angles, abdomen 231 at segment V; tube, length 80, subbasal width 54, apical width 26, terminal setae 160; seta I on abdominal segment IX 45, dilated at tip, II 89, pointed, III 85. Antennal segments: I 27 (32), II 40 (25), III 34 (21), IV 33 (23), V 38 (23), VI 39 (22), VII 34 (18), VIII 30 (10); III without sense-cones, IV with one on either surface.

ARIZONA: Chiricahua Mts., September 5, 1955, J.D.H., 5 ♀♀ (including holotype), from dead vegetation.

Karnyothrips *piceus*, sp. nov.

Much like *prolatus* in color and in that the major setae on the ninth abdominal segment are pointed; but with head little more than 1.3

⁵*Karnyothrips americanus* (Hood) 1908; synonym: *Cephalothrips elegans* Moulton, Bull. Brooklyn Ent. Soc., 24:236, 1929. New synonymy.

times as long as wide, antennal segment VIII narrowed at base and nearly three times as long as wide, and male with glandular area on eighth abdominal sternum in the form of a transverse band traversing the segment just behind middle.

♀ (apterous).—Body, legs, and antennae nearly uniform blackish brown, with tarsi and apices of tibiae pale yellow. Length about 1.3 mm. (distended, 1.7 mm.). Head, total length 0.164, width across eyes 0.116, just behind eyes 0.114, across cheeks 0.122, near base 0.108; eyes, dorsal length 0.050, width 0.032, interval 0.053; postocular setae pointed, 33 μ long, 95 apart, and 16 from eyes; prothorax smooth, 100 μ long, 193 across coxae, epimera not fused with notum, antero-marginal setae minute, epimerals 46 μ and very slightly dilated, other major setae pointed, antero-angulars 20, midlaterals 10, postero-marginals 37, coxals 23; mesothorax 183 across anterior angles, abdomen 255 across segment IV; tube, length 83, subbasal width 53, apical width 29, terminal setae 172; setae on abdominal segment IX pointed, 167, II 93, III 106. Antennal segments: I 24 (30), II 41 (24), III 34 (22), IV 39 (24), V 43 (23), VI 44 (21), VII 39 (19), VIII 32 (11); III normally without sense-cones, IV with one on either surface.

♂ (apterous).—Essentially like female.

ARIZONA: Chiricahua Mts., June 14-August 4, 1955, J.D.H., 9 ♀♀ (including holotype taken July 15) and 4 ♂♂ (including allotype taken July 24), from dead vegetation.

Karnyothrips prolatus, sp. nov.

Readily known by the long head (fully 1.5 times as long as wide), nearly uniform dark coloration of body and antennae, conical eighth antennal segment (not narrowed at base and less than twice as long as wide), pointed major setae on ninth abdominal segment, and, in the male, by the small and nearly circular glandular area on the eighth abdominal sternum.

♀ (apterous).—Body, legs, and antennae nearly uniform blackish brown, with tarsi and apices of tibiae pale yellow and second antennal segment paler in median apical portion. Length about 1.2 mm. (distended, about 1.6 mm.). Head, total length 0.165, width across eyes 0.103, just behind eyes 0.100, across cheeks 0.107, near base 0.093; eyes, dorsal length 0.044, width 0.025, interval 0.053; postocular setae pointed, 22 μ long, 71 apart, and 19 from eyes; prothorax smooth, 110 μ long, 207 across coxae, epimera not fused with notum, antero-marginal setae minute, epimerals 35 μ and slightly dilated, other major setae 20-23 μ and pointed; mesothorax 178 μ across anterior angles, abdomen 267 at segment IV; tube, length 83, subbasal width 57, apical width 30, terminal setae 140; setae on abdominal segment IX pointed, I 93 μ , II 123, III 105. Antennal segments: I 27 (29), II 46 (26), III 30 (22), IV 40 (26), V 43 (23), VI 39 (23), VII 35 (19), VIII 23 (14); III without sense-cones, IV with one on either surface.

♂ (apterous).—Essentially like female.

ARIZONA: Chiricahua Mts. July 2-23, 1955, J.D.H., 5 ♀♀ (including holotype taken July 16) and 1 ♂ (allotype, July 16), from dead vegetation.

Hoplandrothrips nasutus, sp. nov.

Readily known from all other North American species by the long head and extremely long mouth-cone, the head 1.5 times as long as greatest width, the mouth-cone 1.1 times the length of head; antennae nearly black, with only the pedicel of III, and a small spot on its outer surface, yellow.

♀ (macropterous).—Length about 2.4 mm. (distended, 3.0 mm.). Body dark blackish brown, with crimson internal pigmentation; legs about concolorous with body, with all tarsi, both ends of all tibiae, and base of fore femora, paler and more yellowish; fore wings light brown, darker in anal lobe, with a pale streak paralleling posterior margin in middle half. Head 307 μ long, 192 across eyes, 203 across cheeks, 174 in front of the slight basal collar, surface with heavy anastomosing dark lines of sculpture except narrowly along median line, cheeks with minute spiniferous tubercles; postocular setae brown, knobbed, 80 long, 160 apart, and 25 from eyes. Eyes about 110 long, 67 wide, and 58 apart, not protruding. Mouth-cone 336, extending nearly to metasternum. Antennae typical, III fully twice as long as wide, inner surface sigmoid in the usual manner, VIII narrowed in about basal fourth and slightly widened at extreme base, sense-cones large, III 1 (2), IV 2 (2); lengths (and widths) of segments: I 51 (44), II 69 (37), III 100 (47), IV 96 (46), V 80 (37), VI 67 (30), VII 65 (27), VIII 41 (13). Prothorax 374 across coxae, pronotum 178 long medially, the latter smooth except for a few striae along posterior margin; major setae brown, knobbed, antero-marginals 28, antero-angulars 52, midlaterals 30, epimerals 81, postero-marginals 79, coxals 45, the coxae with about 5 additional short, stout, brown, pointed setae; mesothorax 399 across anterior angles, 409 wide posteriorly; fore tarsi with a stout curved tooth; fore wings with the usual pocket at middle, with 15-16 accessory setae on posterior margin, 1.12 mm. long. Abdomen 491 wide at segment IV; tube 196 long, 81 wide near base, 46 at apex, terminal setae 294; seta I on IX 192, II 215, III 176, all three pointed.

ARIZONA: Chiricahua Mts., June 19, 1955, J.D.H., 1 ♀ (holotype), from oak.

Acanthothrips⁶ perileucus, sp. nov.

Very closely allied to *albivittatus*, the antennae being nearly uniform dark blackish brown and the white markings consisting in part of a prominent dorso-lateral vitta on each side, extending from eye to base of pronotum; but differing in that the prothoracic white vittae are narrowed posteriorly and do not involve the inner sides of the epimera and thus do not encroach upon the pronotum at those points, their inner margins diverging, metathorax without white markings, mesonotum with a transverse white dash paralleling posterior margin, abdomen with the white restricted to a pair of small rounded spots at sides of segments II-VII, dorsum of prothorax, pterothorax, and median tergite of segment I of abdomen reticulate with fine dark lines, on which and between which are disposed stipple-like granules.

♀ (macropterous).—Length about 3.0 mm. (fully distended, about

⁶*Acanthothrips nodicornis* (Reuter), 1880; synonym: *Acanthothrips doaneii* Moulton, Bull 12, Tech. Ser., Bur. Ent., U. S. Dept. Agr., Pt. III: 64; 1907. New synonymy.

3.6 mm.). Head, total length 0.392, width across eyes 0.244, across cheeks 0.267 near base 0.217, across basal collar 0.023; eyes, dorsal length about 0.154, distance from posterior margin of head about 0.200 (in paratype treated with KOH: head, total length 0.354; eyes, dorsal length 0.143, width 0.088, interval 0.063, distance from base of head 0.189; mouth-cone, length 0.333); postocular setae, length about 0.053, interval 0.093, distance from eyes 0.029; prothorax, median length of pronotum 0.253, width (inclusive of coxae) 0.475; mesothorax, across anterior angles 0.484; abdomen, greatest width (at segment II) 0.518; tube, length 0.266, width across basal collar 0.102, least apical width 0.059; terminal setae 0.581. Antennal segments (μ): I 65 (52), II 80 (42), III 113 (51), IV 115 (51), V 115 (44), VI 80 (30), VII 67 (28), VIII 39 (16).

♂ (macropterous).—Not essentially different from female in color and structure; sternum VIII with narrow, transverse, glandular area at posterior third.

ARIZONA: Chiricahua Mts., June 18, 1955, J.D.H., 4 ♀♀ and 1 ♂ (this last the allotype), and June 19, 1955, J.D.H., 1 ♀ (holotype) and 1 ♂, all from oak.

Neurothrips apache, sp. nov.

Allied to *magnafemoralis* through lack of dorsal furrow and lack of wing-retaining setae on abdominal tergum VIII, absence of accessory setae on posterior margin of fore wings, bicolored tube, and toothed fore femora; but differing in having the cheeks nearly straight and parallel in anterior two-thirds (instead of strongly arched), dorsal length of eyes decidedly less than their distance from posterior margin of head (instead of about equal to that distance), general color paler, with antennal segments I and II golden yellow (instead of blackish brown), and the tube dark blackish brown in about apical seventh (instead of in apical half or more).

♀ (macropterous).—Length about 2.3 mm. (fully distended, about 2.6 mm.). Color (by reflected light) very pale, by naked eye with only head, pterothorax, and median portion of abdomen dark; head, anterior part of pronotum, all of abdominal segment IX, and posterior half of VIII, orange or brownish yellow; remainder of pronotum and of abdominal segment VIII, lateral thirds of abdominal segments I-V, and most of tube, chalky white, the basal third of tube yellow and without white internal pigment, its apical seventh nearly black; abdominal segments II-VII each with a small dark lateral spot, I-VII dark gray medially, these latter dark areas darkest at their sides and, on VI and VII, consisting usually of two separated diverging dashes; antennae largely dusky yellow, or golden yellow, IV shaded with brown and V with blackish brown in swollen portion, VI not shaded, VII and VIII dark blackish brown except for yellow pedicel of VII; legs white, with nearly black tarsal cups and with all tibiae and the middle and hind femora with a black mark or ring around middle; pterothorax variegated with light and dark markings, of which the most conspicuous is a large metanotal light area in the form of a deeply incised arrow-head or (perhaps better) an olla. Head, total length 0.293, width across eyes 0.203, across cheeks (exclusive of tubercles) 0.238, near base 0.210; eyes, dorsal length 0.112, width 0.060, interval 0.075 distance from posterior margin of head 0.143; postocular setae 0.023, interval 0.066,

distance from eyes 0.017; mouth cone, length beyond posterior dorsal margin of head 0.154; prothorax, median length of pronotum 0.168, width (inclusive of coxae) 0.398, antero-marginal setae 0.017, antero-angular 0.030, midlateral 0.021, epimeral 0.033, postero-marginal 0.024, coxal 0.030; mesothorax, width across anterior angles 0.399; abdomen, width at segments II and III 0.423; tube, length 0.245, subbasal width 0.067, apical width 0.062, terminal setae 0.756. Antennal segments (μ): I 53 (36), II 65 (36), III 87 (36), IV 83 (35), V 78 (34), VI 58 (27), VII 56 (25), VIII 26 (16).

♂ (macropterous).—Not essentially different from female in color and structure; sternum VIII with a pair of longitudinally elliptical, glandular areas at lateral thirds.

NEW MEXICO: Peloncillo Mts., June 25-September 1, 1955 (holotype and allotype taken July 5), 56 ♀♀ and 24 ♂♂, J.D.H., Robert J. Miller, and William C. Miller, Jr.; Rodeo, July 28, 1955, J.D.H., 3 ♀♀.

ARIZONA: Chiricahua Mts., near Portal, July 11, 1955, J.D.H., 2 ♀♀ and 2 ♂♂; ca. 8 mi. S.W. of Rodeo, N.M., August 9, 1955, J.D.H., 1 ♀.

This species lives exposed on the bark of desert shrubs. From sun-burned head to dark-tipped tube, it is an intricate symphony of the soft colors of the arid desert in which it lives, and is certainly one of the most beautiful thrips known. No other specific name would seem wholly appropriate to a species which inhabits the last stronghold of the Apaches and which bears on its back a typical Indian water-jug.

Glyptothrips arkansanus, sp. nov.

Differing most conspicuously from the type species (*flavescens*) in having the pronotum, metanotum, and median tergite of first abdominal segment reticulate instead of minutely tuberculate, the antennae with a more or less evident suture separating the morphological seventh and eighth segments, and the antero-angular pronotal setae much farther apart than figured for *flavescens*.

♀ (macropterous).—Length about 1.6 mm (fully distended, 1.9 mm). Color brown, with head and prothorax usually paler and somewhat yellowish; abdomen with two longitudinal pale lines dividing terga II-VIII approximately into thirds, the median third of the terga II-VII pale posteriorly, tube yellowish apically and tipped with gray; legs dull yellow; fore wings pale yellowish brown in basal half, dusky in apical half, with a slight dark median line in middle third; antennae nearly uniform grayish yellow but darkened in apical half of terminal segment. Head formed as in type species, about 193 long, 149 across eyes, 138 just behind eyes, 165 across cheeks, 155 at base, 91 across head-process; surface reticulate in the usual manner; postocular setae 40, interval 142, distance from eyes 29, their tips dull; eyes 50, width 35, interval 80; mouth-cone normal, extending about 60 beyond posterior dorsal margin of head. Antennae normal in form of segments, but with an obsolete partial suture marking the union of the morphological seventh and eighth segments; I 47 (42), II 54 (36), III 64 (41), IV 52 (43), V 51 (36), VI 48 (30), VII + VIII 72 (25); sense-cones and setae normal. Prothorax 120, across coxae 284, its anterior margin with a slight median lobe, its surface largely reticulate but without tubercles; antero-marginal setae wanting, antero-angulars 31, arising in the angles themselves and

thus much farther apart than in *flavescens*, epimerals 57 and dull at tip, coxals minute, midlaterals and posteromarginals 30-33; mesothorax 301 across anterior angles; metanotum reticulate, the lines pale and distinct, the reticles not elevated at their middle into a low tubercle; fore wings 714, without accessory setae on posterior margin, distal subbasal seta much longer than the others and about as long as epimerals. Abdomen 346 at segment III; median tergite of I with anterior portion subretangular and reticulate, without low tubercles; posterior pair of wing-retaining setae on terga III-VII sigmoid; tube 197, across basal collar 83, at tip 33, sides straight and evenly tapering to tip from about basal sixth, terminal setae 78; most setae rounded at tip (not dilated), I on IX 83 and dull, II more tapering and nearly pointed.

♂ (brachypterous).—Smaller than female, but like it in all essentials; glandular area on sternum VIII in the form of a narrow transverse band just behind middle.

ARKANSAS: Stillwater, March 16, 1957, Dr. Willard H. Whitcomb, 29 ♀♀ (including holotype) and 2 ♂♂ (including allotype) from *Andropogon virginicus*.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

STUDIES ON SPIROBOLOID MILLIPEDS. IV. THE
CHARACTERS AND RELATIONSHIPS OF THE
GENERA *NARCEUS* RAFINESQUE 1820 AND
SPIROBOLUS BRANDT 1833*

BY RICHARD L. HOFFMAN

One of the primary reasons for the present unsatisfactory condition of systematics in the Diplopoda is that much of the groundwork was laid by investigators who had little knowledge of, or interest in, certain principles of zoological nomenclature which are now generally regarded as axiomatic. For the most part, the successors of these men have not challenged their authority, and have thus perpetuated the errors. The practice of consulting original literature references has become increasingly neglected.

Of the various workers who have, in one way or another, dealt with the family Spirobolidae during the past century, only a few were guided by the basic tenets of nomenclatorial procedure, the majority seeming to follow the courses of their own concern for convenience. As one of the results, the general conception of the Spirobolidae has become founded upon a species not even congeneric with the true type species of *Spirobolus*! By sheer good luck, it happens that this "generotype by usurpation" does belong to the same family as *Spirobolus*, otherwise the ensuing confusion would have been far greater than is actually the case.

For almost 100 years, the name *Spirobolus* has been applied to the genus of spiroboloid millipeds occurring in eastern North America, although Cook pointed out the error of such an association in 1904. With the recent discovery of a valid generic name—13 years older than *Spirobolus*—for the Nearctic species, it became obvious that finally something would have to be done about clearing up the Chaos. I believe that it is now possible to do so, and offer the following resolution of the matter.

HISTORICAL SUMMARY

Spirobolus was proposed in 1833 by J. F. Brandt for two new species, *S. Olfersii* from Brasil and *S. Bungii* from China. No type was desig-

*Previous papers under this general heading have appeared in these *Proceedings*, as follows: I. vol. 66, pp. 179-183, 1953; II. vol. 68, pp. 31-36, 1955; III. vol. 68, pp. 151-154.

nated, and although no specifically diagnostic characters (such as male genitalia) were stipulated for either species, enough information was given that, with a consideration of the localities cited, it should have been possible for later workers to identify the genus.

Brandt's immediate successors (such as Gervais) copied his descriptions in their own works, but did not add to our knowledge of either the genus or its two included species. In 1865 the generic name was brought to the North American fauna by Wood, who referred Say's *Julus marginatus* (1821) to the genus. And as *Spirobolus marginatus* this creature eventually became one of the best known of all millipeds. Simultaneously, *bungii* and *olfersii* gradually slipped into obscurity as workers automatically came to think of *Spirobolus* in terms of *marginatus*, its only well-known (*ergo* typical!) species.

Pocock endeavored to bring the matter into its correct perspective in 1894, when he designated *bungii* as the type species of *Spirobolus*. This action, of course, was entirely justifiable, as *bungii* was one of the species originally included in the genus. Pocock described another new spiroboloid, *S. walkeri*, from eastern China, and discussed its relationships to the known Chinese species (*bungii* Brandt and *exquisitus* Karsch). Two years later, in 1896, Brolemann added another name, *S. joannisi*, to the roster of species from southeast Asia, so that by 1900 it was known that species considered to belong to *Spirobolus* occurred in both China and North America. That they were regarded as closely related is demonstrated by the opinion of Attems in 1910 that *joannisi* is a synonym of *marginatus*.

The situation was summarized in 1914, in Brolemann's useful *Etudes sur la Spirobolides*. Brolemann admitted that Pocock had made a valid type designation in selecting *bungii*, but he observed that Brandt's species was still poorly known, and that the American form taken to be *marginatus* might for the sake of convenience be regarded as the entity from which the characters of the genus *Spirobolus* could be inferred. His contemporaries and successors readily embraced this proposal, and *bungii* has not, to the best of my knowledge, been mentioned in the literature for the past forty years.

Shortly after I began the study of diplopods, my colleague H. F. Loomis called my attention to the fact that *Spiroholus* was based on exotic species, and that Cook in 1904 had proposed the name *Arctobolus* for the American forms. But for various reasons no action was taken in this connection until 1953, when, with the discovery of Rafinesque's name *Narceus*, it became apparent that the continued use of *marginatus* as the type of *Spirobolus* would result in the loss of Brandt's generic name as a junior synonym. An investigation was then undertaken regarding the status of the animals involved as well as of the nomenclature affecting them. The decision offered here has been made upon both nomenclatorial and morphological information, and the latter phase will be presented first.

THE IDENTITIES OF THE GENERA *SPIROBOLUS* AND *NARCEUS*

I.

By very good fortune, the United States National Museum contains material of a spiroboloid taken 65 miles north of Peking, China (the

type locality of *bungii*), and these virtual topotypes agree in all important respects with the original description. So far only four large spiroboloid species are known from eastern China, and these are all congeneric. I believe there can be no doubt that the Peking material, if not identical with Brandt's species, is at least very closely related and represents the genus in its strict sense. Until information to the contrary is forthcoming, I shall regard the specimens as belonging to the species *bungii*.

It may be observed from the accompanying figures that the genitalia of this form are very similar to those of the American species. No generic differences whatever can be found in the anterior gonopods, nor have I been able to discover any notable external differences affecting the bodies of the species examined. There is, however, one apparently constant difference involving the posterior gonopods, namely the relative length of the prefemoral process. In *Spirobolus bungii* and its geographically associated relatives, this process is about half the length of the distal joint of the gonopod itself (fig. 3). On the other hand, this process in the American forms is much longer, and equals or exceeds the tip of the telopodite (fig. 1). This distinction, although not par-



ticularly outstanding, is constant in the material I have seen (as well as in literature illustrations) and its utilization as a generic character would seem to be fully justified. In addition to the drawings of the genitalia, I append at this point a brief description of the specimens which I take to represent *bungii*.

Spirobolus bungii Brandt

Figs. 3, 5

Described from a male specimen [USNM] from Tsin Lung Shan, 65 miles north of Peking, China, collected by A. deC. Sowerby.

♂, ca. 80mm. long, 6.0mm. wide, with 55 segments.

Color mostly faded, but enough pigment remains to indicate that in life the animal was dark gray or blackish, with the caudal edge of the segments, the legs, tip of telson, and entire margin of collum yellowish or reddish.

Body stout, about 13 times as long as broad.

Head smooth and evenly convex; epipharyngeal groove distinct as far up as lower edge of antennal sockets; genae slightly swollen, entirely smooth, not margined. Labral setae 8-8, clypeal foveolae 4-4. Antennae rather short, not reaching to middle of 2nd segment when extended back; antennal articles smooth, somewhat compressed, the basal four mostly glabrous, the last three becoming increasingly setose; 2nd article largest; 4 terminal sensory cones. Eyes subtriangular, small, the interocular space about a third greater than largest diameter of an eye patch. Ocelli irregular in size and shape, about 40 in each cluster.

Collum of the usual spiroboloid form, the front edge set off by a marginal groove which extends up to the level of base of mandible. Entire surface smooth, sprinkled with very minute, widely separated punctures.

Pleurotergites of 2nd segment produced cephaloventrad into a conspicuous, strongly striate lobe projecting below and in front of the ends of the collum on each side.

Dorsal surface of segments with very shallow transversely oblong depressions on the midbelt, which is otherwise smooth and impunctate. Hindbelt slightly raised, smooth and shining, with a few tiny widely separated punctations. Transverse suture distinct across dorsum and down sides, passing behind the pores.

Preanal segment produced at the midline, forming a blunt subtriangular telson, much exceeded by the valves. Latter smooth, and polished, considerably swollen, meeting at a re-entrant angle, the free edges not set off by a submarginal groove. Preanal scale very broadly transverse, the width several times as great as the length.

Legs smooth, compressed, vestiture reduced to a single seta at the ventral end of each joint, except that the tarsal joints usually have from 3 to 6 macrosetae on the ventral side and another just above the insertion of the tarsal claw. Tarsal joints without velutinous pads. 1st and 2nd pairs of legs conspicuously smaller than those following. Prefemora of legs 4-7 compressed ventrad to form a rather acute edge but not excavated or otherwise modified. Coxal lobes of legs 3-7 not enlarged, consisting only of rudimentary blunt points.

Anterior gonopods very similar to those of *Narceus*, consisting of a V-shaped sternite, the coxites with mesially directed endite lobes, and

concave telopodites which partially envelop the posterior gonopods. Latter robust and hoodlike distally, their basal prefemoral process short and becoming terminally truncated and enlarged, less than half as long as telopodite. Coxae of posterior gonopods slender, fused with the spatulate coxal apodemes, connected only by the connective tissue surrounding the genitalia.

II.

The first description of a North American spiroboloid seems to be that of *Julus americanus* by Palisot Beauvois in 1805-1820, based upon a specimen doubtless taken along the eastern seaboard and probably at either Philadelphia or Charleston. This name was considered *inquirendum* by H. C. Wood in 1865, and was not rescued from oblivion until 1893, in a posthumously published paper by Charles H. Bollman.

Even more curious is the neglect of Rafinesque's 1820 names, which included the new genera and species *Narceus tinctorius* and *Rhexenor annularis*, both combinations being founded upon specimens of the composite "species" long known as *Spirobolus marginatus*. Rafinesque's descriptions mention size, color, segment number, minor structural details, and even an observation about the animal's defensive secretions. Although Rafinesque's contemporaries knew his work, and parts of it were cited by later workers, all apparently thought his only myriapod species was *Selista forceps*. In 1952 I accidentally discovered that Rafinesque had actually described six centipeds and four millipeds in *The Annals of Nature*, and the probable identity of these Rafinesquean species was considered by Dr. Crabill and me in 1953. *Rhexenor* and *Narceus* are generic synonyms, the latter having page priority, and *Narceus* is thus the oldest generic name proposed in what is now the order Spirobolida. Its type species, by monotypy, is *N. tinctorius*, based upon specimens from Kentucky. Since another of Rafinesque's diplopods was specified to have been found in the "knobby hills of Estill county, in Kentucky," I consider the same area suitable to serve as the restricted type locality. Specimens were obtained there in May 1954, and form the basis for the following redescription of the species.

Narceus tinctorius Rafinesque

Described from two male topotypes, RLH 6074, collected in the "Knobs" along State Hy. 80, about 5 miles southeast of Irvine, Estill Co., Kentucky, on May 9, 1954.

♂, 125mm long, 9.5mm wide, with 51 segments.

♂, 90mm long, 7.2mm wide, with 51 segments.

Color very dark slate gray, almost black, the caudal edges of the segments slightly tan, edges of the collum almost orange, antennae and legs reddish brown.

Body very stout, only about 13 times as long as wide.

Head convex, polished; epipharyngeal groove distinct as far up as lower edge of antennal sockets; genae not laterally margined, but with numerous fine ventrolaterally directed grooves. Labral setae 10-11 and 7-7, clypeal foveolae large and conspicuous, 5-5 and 6-5. Interantennal space with several fine transverse striae. Antennae moderately short, not reaching caudal margin of 2nd segment when extended back; articles smooth, compressed, the basal four glabrous, last three becoming increasingly pilose; 2nd article the largest, others except last slightly smaller

and subequal in size; 4 terminal sensory cones. Eyes suboval to reniform, large, interocular space about equal to greatest diameter of an eye patch. Ocelli very irregular in size and shape as well as number, 53-48 in one specimen and 38-42 in the other.

Collum of the usual spiroboloid form, its front edge with a distinct margining groove running from the tip up to about the middle of the eye patch. Entire surface, except marginal areas, finely and densely punctate, the punctures of the middorsal area tending to be joined by a network of fine grooves.

Pleurotergite of 2nd segment produced cephaloventrad into a conspicuous, strongly striate lobe projecting below and in front of the end of the collum.

Dorsal surface of segments densely punctate, the punctures finer on the midbelt and much coarser on the slightly raised and polished hind-belt. Transverse suture distinct across dorsum and down sides, passing behind the pores. Lower sides sculptured with about 20-25 striae of a flattened V shape, becoming more prominent ventrad.

Preanal tergite forming a blunt subtriangular telson, much exceeded by the valves. Latter slightly convex basally, the swollen free margins set off by a shallow crescentic depression. Preanal scale of the usual subtriangular shape.

Legs smooth and shining, vestiture reduced to a single seta at the ventral end of each joint (these missing entirely in the larger specimen) and usually two setae on the ventral side of the last joint. Ventral setae of the first pair of legs: 0-5-3-2-4-6; of the second: 0-1-3-2-4-(3)-5; of 3rd through 7th: 0-0-0-0-0-2. These formulas are constant in both specimens. Tarsal joints without pads. 1st leg pair not strongly reduced. Prefemora of legs 4-7 strongly compressed and excavated on the caudoventral surfaces. Coxal lobes of 3rd pair roughly pentagonal in shape, with the laterobasal side longest; coxal lobes of 4th-7th pairs slender, elongate cones, those of the 7th pair abruptly tapering distad from a swollen base.

Pleurites of 7th segment small, slender, mesially produced lobes which touch at a visible and distinct midventral suture. Anterior gonopods (fig. 4) of the usual spiroboloid type, composed of narrow transverse sternite (ST), coxites (CX) with mesially produced endite lobes (CXL), and strongly concave telopodites (TL), all three elements being connected by distal ramification of the coxal apodemes (CXA). Posterior gonopod (fig. 1) robust, with an elongated, lamellate prefemoral process which exceeds the end of the tibiotarsal portion.

III.

Numerous species, clearly congeneric with *tinctorius*, have been described from eastern United States. The existing literature descriptions are entirely inadequate for evaluation of these names, and a satisfactory settlement must await a thorough revision of the genus. On the basis of material already assembled toward this end, I am inclined to believe that most of the named forms will prove to be but geographic races, whose definition will have to depend upon more subtle characters than hitherto employed. For the purposes of this paper, it will be sufficient merely to point out the distinction between the Chinese and American genera which have previously shared the name *Spirobolus*.

Selecting the structural peculiarities, which, when taken in combination, appear to warrant the recognition of two distinct genera, we can arrive at the following brief differentiating couplet. Of Chinese forms I have seen material of what appears to be Pocock's *S. walkeri*, in addition to the series of *bungii*, and include here an illustration of the posterior gonopod in this species.

1. Prefemoral process of posterior gonopods short, less than half as long as telopodite; anal valves swollen and meeting at a moderate re-entrant angle, completely lacking margins on the free edges; tergites smooth with very tiny, scattered punctuations; anterior coxae of males without modified lobes..... *Spirobolus* Brandt
 Prefemoral process of posterior gonopods extending distad as far as end of telopodite; anal valves less swollen and with definite raised mesial margins; tergites coriaceous or slightly rugose, usually with very pronounced punctuation; anterior coxae of males with variously modified coxal lobes..... *Narceus* Rafinesque

NOMENCLATORIAL CONSIDERATIONS

The two genera under discussion may be summarized with respect to their nomenclatorial status, as follows:

Spirobolus Brandt

Spirobolus Brandt, 1833, Bull. soc. nat. Moscou, vol. 6, p. 203.—Pocock, 1893, Journ. Linnean Soc. London, Zool., vol. 24, p. 484.—Brolemann, 1914, Ann. soc. ent. France, vol. 83, p. 31.

Prospirobolus Attems, 1910, in: Voeltzkow's Reise Ostafrika, vol. 3, p. 90 (type, *Spirobolus joannisi* Brolemann, 1896).

Sinobolus Chamberlin and Wang, 1953, Amer. Mus. Nov., no. 1621, p. 12 (type, *Spirobolus joannisi* Brolemann 1896).

Type species.—*Spirobolus bungii* Brandt 1833, by subsequent designation of Pocock, 1894.

Synonymy.—The authors of *Sinobolus* erected the genus with the following characterization:

"Posterior gonopods lacking the free inner piece present, e.g., in the American *Narceus* Raf. (= *Spirobolus* as restricted by Brolemann). This perhaps represented by a transverse arm projecting mesad from base of gonopod proper. This arm with short angle or process projecting distad from its free end, while from its basal end a spine or curved finger-like process projects, lying against the base of the gonopod proper. Median plate of anterior gonopods absent or abortive.

"Generotype: *Spirobolus joannisi* [sic] Brolemann."

It will be noted that Chamberlin and Wang detected the outstanding difference between *joannisi* and the American species, although I fail to understand why comparison was made only with *Narceus* while the legitimate claims of Brandt's *Spirobolus* to be considered were quite disregarded. Nor do I entirely understand the statement that the sternite of the anterior gonopods is absent or abortive. Brolemann's figure shows a well-developed sternite.

However, since *joannisi* is pretty clearly congeneric with *bungii*, consideration of *Sinobolus* is not necessary. Even if Brandt's type should be found, and *bungii* shown to be generically different from my present concept of it, there remains the much older name *Prospirobolus* Attems for *joannisi* and its close relatives.

Narceus Rafinesque

Narceus Rafinesque, 1820, *Annals of Nature*, vol. 1, p. 9.—Hoffman and Crabill, 1953, *Florida Entom.*, vol. 36, p. 80.

Rhexenor Rafinesque, 1820, *Annals of Nature*, vol. 1, p. 9 (type: *R. annularis* Rafinesque [= *Narceus annularis* (Rafinesque)], by monotypy).—Hoffman and Crabill, 1953, *Florida Entom.*, vol. 36, p. 81.

Spirobolus (*nec* Brandt) Wood, 1865, *Trans. American Philos. Soc.*, vol. 13, p. 207.—Bollman, 1893, *Bull. U. S. Nat. Mus.* No. 46, p. 145.—Chamberlin, 1947, *Proc. Acad. Nat. Sci. Philadelphia*, vol. 99, p. 44.

Arctobolus Cook, 1904, *Harriman Alaska Exped.*, vol. 8, p. 64 (type: *A. onandaga* Cook [= *Narceus annularis* Rafinesque], by original designation).

Type species.—*Narceus tinctorius* Rafinesque, by monotypy.

Synonymy.—Both *Rhexenor* and *Arctobolus* are junior subjective synonyms of *Narceus*, based upon specimens from New York State which are apparently conspecific. Had the Rafinesque names not been available, *Arctobolus* would be the correct generic name for the American forms, as maintained by Cook, and following him, by Loomis in numerous papers.

The status of the species of *Narceus* remains badly confused, and final resolution of the problem will depend upon a careful monographic study of the genus.

ACKNOWLEDGEMENTS

I wish to indicate my indebtedness to Drs. Howard E. Evans and John G. Franclemont of the Department of Entomology, Cornell University, who kindly read the manuscript of this paper in its early stages and made several valuable suggestions for its improvement. Dr. Edward A. Chapin, former curator of the Division of Insects, United States National Museum, generously loaned the Chinese specimens which made the project possible.

EXPLANATION OF FIGURES

Fig. 1. *Narceus tinctorius* Rafinesque, caudomesial aspect of left posterior gonopod, from topotype, 5 miles east of Irvine, Estill County, Kentucky.

Fig. 2. *Spirobolus walkeri* Pocock, caudomesial aspect of left posterior gonopod, specimen from Hangkow, China (O. F. Cook and H. F. Loomis, colls.).

Fig. 3. *Spirobolus bungii* Brandt, caudomesial aspect of left posterior gonopod, specimen from 65 miles north of Peking, China (A. deC. Sowerby, coll.).

Fig. 4. *Narceus tinctorius*, anterior gonopods, anterior aspect on the left, posterior on the right. Drawn from a cleared mount, the coxal sutures distinct.

Fig. 5. *Spirobolus bungii*, anterior gonopods, anterior aspect. Coxae and coxal apodemes slightly separated from sternite during dissection of the specimen, normally much as in *Narceus*.

Abbreviations: CX: coxite; CXA: coxal apodeme; CXL: coxal endite lobe; S: Sternite; TL: telopodite; PF: prefemoral process of posterior gonopod.

PROCEEDINGS
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A SYNOPSIS OF THE GENUS *ESSIGELLA* (APHIDAE)

F. C. HOTTES

I deeply appreciate the loan of type material and named and unnamed slides from E. O. Essig. I am indebted to M. A. Palmer for the loan of type material from the Colorado Collection, for making the drawings and for her valued opinions on all species, particularly on the species described as new, but for which I take sole responsibility. A. A. Granovsky made available the type of *E. pini* Wilson which is now in his collection. G. W. Simpson sent me the material studied by Edith Patch. G. F. Knowlton sent his named and unnamed species. The United States National Museum, through Louise M. Russell made available types, and named and unnamed material. To all of these I would express my thanks.

The genus *Essigella* was erected by Del Guercio in 1909 for *Lachnus californicus* Essig, which had been described earlier that same year. *Revista di Patologia Vegetale*, Pavia, Anno III, n. 20-21, 1909. C. F. Baker, Editor of *Pomona Journal of Entomology*, Vol. 1, No. III 1909 gives a free translation of the original description. The genus was again characterized in 1920 by A. C. Baker in his *Generic Classification of the Hemipterous Family Aphididae*, at which time only two species were known to belong to the genus.

The genus *Essigella* belongs to the Subtribe *Eulachnina* Baker, which belongs to the Tribe *Lachnini* Wilson. There are three genera in the Subtribe *Eulachnina*, all of which have the rostrum obtuse, the fifth segment much reduced. The cornicles are shallow, with the base not much wider than the rim, with few or no hairs, or with the cornicles reduced to a rim. All live on the needles or leaves of *Coniferae*.

KEY TO GENERA OF EULACHNINA

1. First tarsal segment with dorsal hairs; cornicles free from hairs . . . 2
 First tarsal segment without dorsal hairs; cornicles with some hairs *Schizolachnus* Mordvilko
2. Antennae of five segments; apex of claws modified . . . *Essigella* Del Guercio
 Antennae of six segments; apex of claws simple . . . *Eulachnus* Del Guercio

Genus *Essigella* Del Guercio

Characters.—Body elongate and narrow; head much broader than long; ocular tubercles absent. Antennae five segmented, bearing minute hairs or bristles; unguis with primary sensorium; rostrum broadly obtuse at apex. Fore wing with media simple or once branched, hind wing with both media and cubitus present. Cornicles free from hairs, reduced to mere ring, or with base only slightly larger than ring, and little raised. First tarsal segment elongate, dorsum with two or more hairs. Claws bifurcate or with only one fork developed. Cauda rounded or with median posterior tubercle. Living on the needles or leaves of *Coniferae*. Type (monotypical), *Lachnus californicus* Essig.

Baker, A. C.

1920. Generic Classification of the Hemipterous Family *Aphididae*. U. S. Dept. of Agr. Bul. 826; pp. 13-14

Baker, C. F.

1909. Concerning Two New Genera and Three New Species of Aphids of California G. Del Guercio. *Pomona Jour. Ent.* Vol. I No. 3, pp. 73-74

Essig, E. O.

1909. *Aphididae* of Southern California I. *Pomona Jour. Ent.* Vol. I, No. I pp. 1-4, figs. 1-2. (fig. 2 is a plate)

Guercio, (Del Guercio G.)

1909. Intorno a due nuovi generi e a tre specie nuove di afidi di California. *Rivista di Patologia Vegetale* Anno III. Num. 20-21 pp. 328-329. Genus *Essigella* described p. 329.

In the past, species of *Essigella* have been thought to be confined to species of *Pinus* for their host. This is no longer true; at least one species is known from *Pseudotsuga*, and one species has been taken on *Abies*.

In the descriptions I make use of two terms which I define as follows: Cape, the pigmented area on the dorsum of the body, which may extend laterally on to the venter. It is not present in all species, Brush, that area on the inner margin of the tibiae near the apex thickly clothed with fine short hairs.

All drawings, except those of *E. hoerneri* Gillette and Palmer which were drawn from paratype specimens, were drawn from either holotype, lectotype, morphotype or allotype specimens, and the measurements indicated are from those specimens. Where other measurements are given they are within brackets.

Collection of material. Collectors in the past have collected individual specimens of *Essigella* by closely observing the needles of pines for them. That this method is productive is witnessed by the species described herewith, but it is extremely time consuming, first because many trees are without specimens, and second the individual specimens in most cases are widely spaced, once located on a given tree. The writer prefers to collect specimens of *Essigella* as well as *Cinara* by beating, jarring the specimens from the needles, by means of a club, the handle of a prospectors pick, being ideal as to length and weight for this purpose. The specimens are then collected with forceps from the surface of a Turkish towel which has been tightly stretched over a twenty-four inch hoop to which a short handle has been attached.

Not only does the rough surface of the towel give the specimens something to hold to, but it holds them up, so that they may be easily lifted without injury. Furthermore the rough surface of the towel cuts down the movement of air, so that specimens are not easily blown away. As to color of towel, I prefer yellow, but any color that contrasts sharply with the color of most species to be collected should work.

Rearing. Specimens of *Essigella* may be reared on branches of the host tree placed in water, or upon young potted trees of the host species. Transfers of specimens from branches of one tree to branches of another are not always successfully made. It is best to make use of branches of the original host tree. When it is thought necessary, specimens on small twigs may be caged by placing a lamp or lantern chimney over the twig and its container, the top of the chimney being covered with cloth fastened to it by scotch tape. In special cases it is well to surround the container and chimney by a moat. The moat serving the double purpose of preventing the escape of specimens possessed of wanderlust, from the bottom, should they fall or wander from the twig, and at the same time it prevents their desiccation until discovered.

Small twigs intended for rearing specimens should always be examined for spiders and other predacious forms. As a preliminary to examination, it is well to wash off such twigs with a hose.

This past summer I was intrigued by a method used by D. Hille Ris Lambers for rearing aphids. He made use of small plastic bags as containers for the aphids and portions of their host plants. Use of this method does away with water and cage.

Essigella agilis n. sp.

Plate I

Essigella fusca Gillette and Palmer, (in part) Gillette and Palmer Annals Entomological Society of America Vol. XVII 1924, pp. 6-9.

Essigella fusca Gillette and Palmer, (in part) Palmer Aphids of the Rocky Mountain Region pp. 14-15 1952.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.62-2.75 mm. Color subject to considerable variation, some specimens pale green, others with head, thorax and cape very pale yellowish brown with some green. Apical half of fourth antennal segment and all of fifth segment dusky. Femora pale yellowish with dorsal margins brownish. Tibiae and tarsal segments brownish, but not dark. Antennal segments with the following lengths: III .18 mm., IV .09 mm., V .09 + .04 mm. There are no secondary sensoria, the third segment has no sensoria, fourth and fifth segments with primary sensoria. Prothoracic femora and tibiae about equal in length, varying from .54 — .57 mm. Mesothoracic femora shorter than prothoracic femora, mesothoracic tibiae longer than prothoracic tibiae. Metathoracic femora .90 mm. long, hairs on dorsal margin rather numerous, the longest about .05 mm. Metathoracic tibiae varying in length from 1.05 — 1.17 mm. Hairs on outer margin of metathoracic tibiae varying from .06 — .08 mm. in

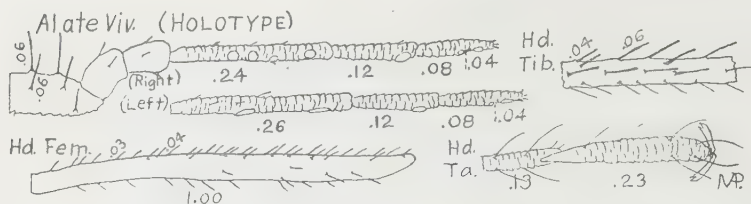
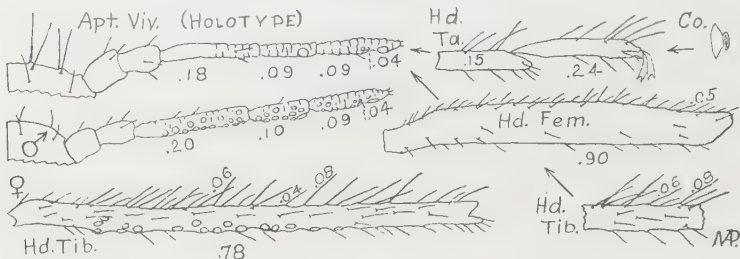
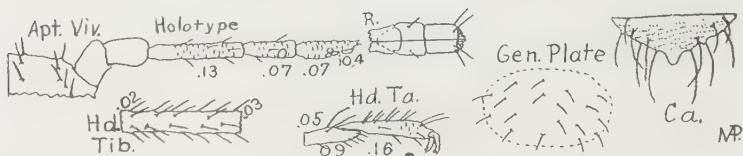
*Essigella pineti* n. sp.*Essigella agilis* n. sp.*Essigella pergandei* n. sp.

Plate I

length, the two lengths being intermixed. The hairs on this surface are slightly dull at the apex. The hairs on the inner margin of the metathoracic tibiae are much shorter than the hairs on the outer margin, finer, and less numerous. The first segment of the metatarsus is .15 mm. in length, the second metatarsal segment is variable in length, measuring from .21 — .24 mm. The dorsum of the first tarsal segment of all legs as a rule has two pairs of hairs. The more basal pair is much shorter than the apical pair and less spine-like. The basal hairs on the prothoracic and mesothoracic first tarsal segments are often very difficult to differentiate. A few specimens have as many as five hairs on the dorsum of the metathoracic first tarsal segment. These hairs are coarse and longer than the width of segment. The dorsum of the abdomen is provided with short, rather coarse hairs, which arise as a rule from small pigmented areas which are slightly darker than the cape. The cornicles are the color of the cape. The median posterior tubercle on the cauda is not well developed. Holotype,

apterous viviparous female, Morphotype, oviparous female, Allotype, apterous male. All taken on *Pinus ponderosa*, south of Glade Park, Colorado. (Mud Springs area). Holotype June 26, 1956. Morphotype and allotype, October 7, 1956, these mounted on the same slide. The two type slides deposited in the United States National Museum. All specimens taken by F. C. Hottes.

Slides seen in addition to types: *Pinus scopulorum* October 1, 1922, oviparous female determined as morphotype of *E. fusca* Gillette and Palmer, Estes Park, Colorado, F. C. Hottes. Paratype slide same data as type, Paratype slide same data as Morphotype. *Pinus ponderosa*, Hat Creek, California, June 24, 1955, E. O. Essig, three slides.

As indicated in the discussion of *E. fusca* specimens of this species were held to be that species by Gillette and Palmer. Specimens of this species may be differentiated from specimens of apterous *E. fusca* by the much lighter cape. Apterous specimens differ from apterous specimens of *E. palmerae* by having shorter hairs on the femora and tibiae, and shorter femora and tibiae.

***Essigella braggi* n. sp.**

Plate II

Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.25 — 2.47 mm. Dorsum of head thorax and abdomen covered by a light brown cape. First antennal segment as a rule more or less concolorous with head, second antennal segment, and varying amounts of the third pale, apex of third and all of fourth and fifth segments dusky. Femora brown, shaded with dusky, often quite dark. Tibiae brown, shaded with dusky, at times quite dark. Tarsi dark brown. Rings of cornicles dark brown.

Antennal segments with the following lengths: III .195 — .23 mm., IV .09 — .12 mm., V .11 — .12 + .045 mm. The third segment is without sensoria. The primary sensoria on the fourth and fifth segments are very small and almost flat. The imbrications on the antennal segments are exceptionally well developed. Hair on antennal segments unusually well developed, distinctly spine-like, very conspicuous on the first and second and third segments, on the third segment the longest almost as long as width of segment. Vertex of head with distinct spine-like hairs which vary in length from .03 — .07 mm. Rostrum hardly reaching base of metathoracic coxae. Prothoracic femora unusually well developed, varying in length from .49 — .57 mm. provided with coarse spine-like hairs, those on the dorsal margin being dull at the apex, on one side the hairs are similar to those on the dorsum, remaining hairs less spine-like, and sharp pointed. Prothoracic tibiae varying in length from .60 — .72 mm. always conspicuously longer than prothoracic femora. Hairs on outer margin of prothoracic tibiae distinctly spine-like, dull at the end, and slightly longer than width of tibiae, but there are some hairs which are only subequal to the width of the tibiae. Hairs on remaining surface of prothoracic tibiae sharp pointed, slightly shorter, finer, but still spine-like. Mesothoracic femora about .45 mm. in length. Hair on mesothoracic tibiae much

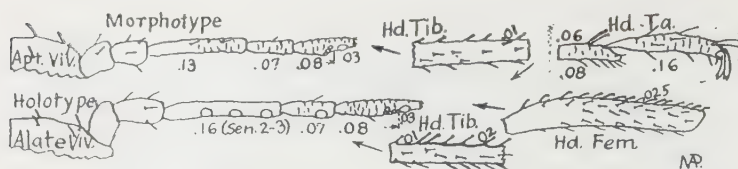
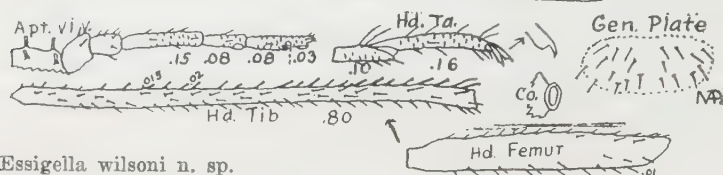
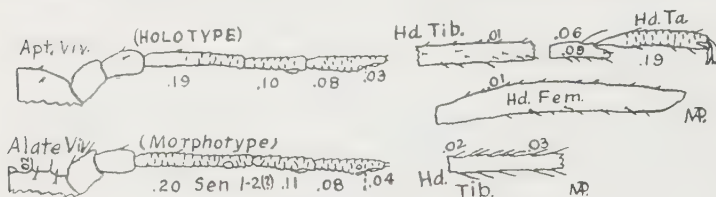
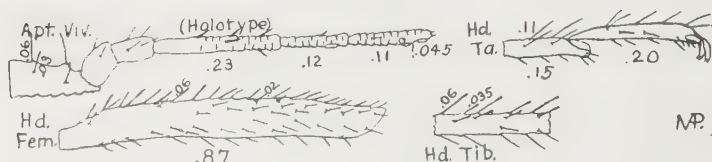
*Essigella essigi* n. sp.*Essigella wilsoni* n. sp.*Essigella swaini* n. sp.*Essigella braggi* n. sp.

Plate II

shorter than the hair on the prothoracic tibiae, varying from about one third to one half the width of the tibiae. Metathoracic femora varying from .78 — .82 mm. in length. Dorsal margin of metathoracic femora with hairs more numerous than elsewhere, varying in length from .02 — .06 mm. dull at the tip and distinctly spine-like, similar hairs are found on one side of the femora, remaining hairs on this segment less spine-like, sharp pointed, the hairs on the ventral surface being few and rather fine. Metathoracic tibiae varying in length from 1.20 — 1.27 mm.

Hairs on metathoracic tibiae distinctly spine-like, varying in length from .035 — .06 mm. The hairs on the outer margin are more spine-like, and longer than the hairs on the inner margin, these hairs are also dull at the tip. On the outer margin shorter hairs alternate with longer. Dorsal surface of first metathoracic tarsal segment with two pairs of long hairs, the hairs being much longer than the width of the segment and very coarse. First tarsal segment of other legs with only one pair of hairs, and these not quite so long as those on the first tarsal segment of the metatarsus.

The first tarsal segment of the metathoracic legs varies in length from .135 — .15 mm. The second tarsal segment of the metathoracic pair of legs is .20 mm. in length, the hairs on the dorsal surface of this segment are much longer than the hairs on the ventral surface, more spine-like, and about one and one-half times the width of the segment in length.

Abdomen.—Dorsum of abdomen with a few short, rather spine-like hairs, which arise from pigmented areas. The hairs on the dorsum vary in length, the shortest being located on the anterior portion, the longest near the posterior portion of the abdomen. Hairs on ventral portion of abdomen in patches, numerous, the more lateral hairs being much longer and coarser than the hairs near the middle. Cauda and anal plate with numerous long sharp pointed hairs. Both cauda and anal plate imbricated.

This robust species may be differentiated by the coarse spine-like hairs on the antennae. From *E. fusca* Gillette and Palmer it may be differentiated by its lighter cape, larger size, shorter tarsal segments, by the fact that the dorsal surface of the pro and mesothoracic tarsal segments have only one pair of hair, and by the shorter hairs on the mesothoracic tibiae. The hairs on the outer margin of the metathoracic tibiae are also shorter and more nearly capitate than are the hairs on this segment of *fusca*.

Holotype, apterous viviparous female, taken on *Pinus contorta*, Tuolumne Meadows, California, August 22, 1955. Collected by J. W. Mac Swain. Type in the collection of E. O. Essig. Two slides of the same collection have been made paratype.

Essigella californica (Essig)

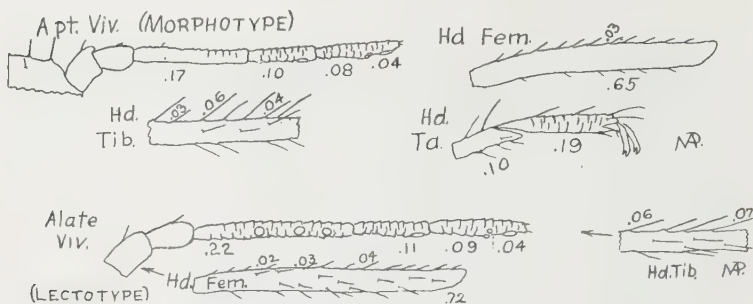
Plate III

Essig, E. O.

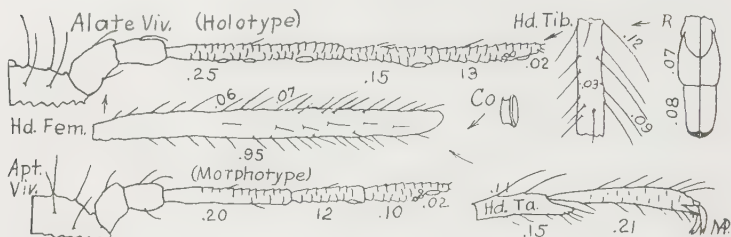
1909. Aphididae of Southern California I. Pomona Jour. Ent. Vol. I, No. I pp. 1-4, figs. 1, 2. Original description (in part)
1912. Aphididae of Southern California X. Pomona College Jour. Ent. Vol. IV, pp. 780-785, figs. 247, 248. *Essigella gillettei* n. sp. Gillette, C. P. and Palmer, M. A.

Gillette, C. P. and Palmer, M. A.

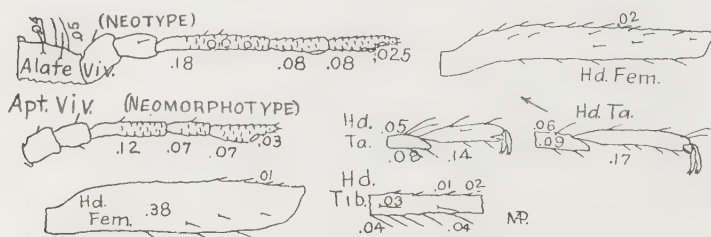
The Aphidae of Colorado, Part I. Annals Entomological Society of America Vol. XXIV 1931 pp. 838-839, fig. 9
Essigella gillettei n. sp.



Essigella californica (Essig)



Essigella gillettei n. sp.



Essigella pini Wilson

Plate III

Patch, Edith

1912 *Aphid Pests of Maine Food Plants of the Aphids Psyllid Notes*. Maine Agricultural Experiment Station Bulletin 202. pp. 169-170 figs. 286, 287. *Essigella patchae* n. sp.

Wilson, H. F.

1919. Three New Lachnids With Comparative Notes on Three Others (Homop.) *Entomological News* Vol. XXX No. 1,

pp. 1-2, figs. 1-6. *Essigella wilsoni* n. sp., *Essigella gillettei* n. sp.

As indicated under the description of *E. essigi*, Essig did not base his original description of this species entirely upon specimens belonging to it. Nor is Essig's redescription of this species in part X Aphididae of Southern California limited to it, the material in part consisting of *E. gillettei*. The references to *californica* by Gillette and Palmer, and those of Knowlton refer to *E. gillettei*. Wilson's 1919 reference to this species was most likely based on two species, *E. wilsoni* n. sp. and *E. gillettei* n. sp. This is indicated by Wilson's figures which do not agree with his description, and by his mention of two host species. The species recorded by Patch under this name is 1912 from *Pinus strobus* belongs to *E. patchae* n. sp.

Alate viviparous female.

Only four specimens of this form, from the original material are known to exist, neither is perfect, and neither is in a position to measure accurately as to length. The legs are pale dusky and quite uniform in color, the antennae are the same with the base of the third segment pale. Antennal segments with the following lengths: III .22 mm., IV .11 mm., V .09 + .04 mm. The third antennal segment has three sensoria. Fourth and fifth antennal segments with only primary sensoria. Hairs on antennal segments extremely sparse, fine and short. Vertex of head with a few long sharp pointed hairs, which are about .06 mm. in length. Prothoracic femora about .42 mm. in length. Length of mesothoracic femora about .33 mm. Metathoracic femora varying from .645 — .69 mm. in length, dorsal margin with a few fine, sharp pointed hairs, which are spaced at least in part further apart than the hairs are long. Length of metathoracic tibiae of one original "cotype" specimen 1.14 mm. the tibiae of the lectotype are not complete. Hairs on metathoracic tibiae of same type on both margins, fine, sharp pointed, and varying in length from .02 — .06 mm. with the shortest hairs near the base and the longest near the apex, where the hairs are rather droopy. Hair, as indicated, on original cotype specimen, on inner margin of metathoracic tibiae, much shorter than interval between hairs on upper third of segment, about as long as width of segment elsewhere. Hair on outer margin of metathoracic tibiae about two times width of segment when measured near the apex, shorter than this elsewhere. Cauda with distinct median posterior tubercle. Cauda and anal plate with long hairs. Media forked.

Apterous viviparous female.

Length from vertex to end of anal plate 1.65 mm. Color in life not recorded, probably pale green, definitely without cape. Antennae pale, legs pale dusky, tarsal segments concolorous with ends of tibiae. Antennal segments with the following lengths: III .17 mm., IV .10 mm., V .08 + .04 mm. Third antennal segment without sensoria, fourth and fifth segments with only primary sensoria. Hair on antennae almost absent. Vertex of head with a few moderately long hairs, the hairs being about as long as the width of the second antennal segment. Lengths of pro meso and metathoracic femora as follows: .375, .30, and .65 mm. Lengths of pro meso and metathoracic tibiae as follows:

.41, .45, and .90 mm. Lengths of metathoracic tarsal segments as follows: first, .10 mm., second, .19 mm. Prothoracic femora with a few hairs, hairs on dorsal margin no longer than those on vertex of head. Prothoracic tibiae with hairs on outer margin ranging in length from very short near the base, to hairs which are about equal to width of segment near the apex, the hairs on this margin are fine and sharp pointed. Hairs on inner margin of prothoracic tibiae for the most part about equal in length, and about one-third as long as the longest hairs on the outer margin. They are spaced for the most part further apart than their length. Hairs on outer margin of mesothoracic tibiae extremely short, and dull at the apex. Hairs on inner margin fewer than those on outer margin, slightly longer, and spaced much further apart than their length, more upstanding and sharp pointed. Hairs on metathoracic tibiae ranging in length from extremely short near the base to .06 mm. near the apex, fine and sharp pointed. Hairs on inner margin of metathoracic tibiae about half as long as those on outer margin, but similar to them in texture. First metatarsal segment with two pairs of hairs on the dorsum, apparently one pair of hairs is located on the dorsum of the pro and mesothoracic tarsal segments. Hairs on second metatarsal segment few and short. Median posterior tubercle on cauda well developed.

Lectotype and morphotype aphid collection of E. O. Essig. Both types are part of the original material collected on Monterey Pine, *Pinus radiata*, Claremont, California, Feb. 14, 1909. Four other slides definitely known to belong to the original material have been seen, one that of an alate belongs to this species, one of an apterous belongs to *E. gillettei* n. sp., both are in the Essig collection. The other slides are in the collection of the United States National Museum, one contains the type of *E. claremontiana* n. sp., the other contains two alates of *E. californica*. One other slide in the collection of the United States National Museum is suspected of belonging to the original material, it carries the data, "*Essigella californicus*, Claremont, Cal., E. O. Essig, on pine needles (Monterey Pine) 240.83." The printing is that of Essig. The specimen is an alate viviparous female of this species. The slide is very thick, so that it fits in a slide box with difficulty, in this respect it is similar to the slide on which the lectotype is mounted. It is also similar to the slide on which the Holotype of *E. claremontiana* is mounted. All three slides have similar cover slips and the balsam is similarly stained. I suspect that none of the labels are original, and all differ in size. The number 240.83 is not a Museum number.

Several other slides, determined by Essig as *Essigella californica* have been seen. They were taken by him on *Pinus radiata* at Santa Paula, California, June 26, 1911 and carry the number "47". Some are of *E. gillettei* n. sp. and were perhaps made use of by him in his redescription of this species which he published in 1912.

This species differs from *gillettei* in shorter fourth antennal segment, shorter tibiae and femora, and shorter, fewer and more droopy hairs on the tibiae. The hairs on the dorsal margin of the metathoracic femora are also very much shorter.

At the time Essig described this species Holotypes were not being designated by aphid workers, and it may be questioned if the slides

which constitute the remaining original material cited in the original description as "common on some cultivated pines at Claremont, California during the winter of 1908-09." but which actually carry the data, "Monterey Pine, Claremont, California, February 14, 1909," were cited as cotypes on the slides at the time of description, because only the original slides remaining in the Essig collection are so indicated. The labels on these slides are not original. As indicated here, and in the descriptions of *E. gillettei* n. sp., *E. claremontiana* n. sp., and *E. essigi* n. sp. the original material did not consist of one species.

Palmer, 1952, p. 14 indicates the type as being in the Essig collection and gives the number as "47". It may be assumed that neither Gillette or Palmer ever saw the type, they having seen only a slide bearing the number "47" determined by Essig as *californica*, now in the Colorado Aphid collection to which Palmer has added the word "metatype." The specimens on this slide were taken at Santa Paula, California, by Essig on *Pinus radiata* June 26, 1911. This slide and others with similar data have been seen. None of the slides taken at Santa Paula in 1911 are eligible for designation as holotype, lectotype or metatype. All specimens of this collection are *E. gillettei* n. sp.

Essigella claremontiana n. sp.

Plate IV

Essig, E. O. *Lachnus californicus* (in part)

1909. Aphididae of Southern California I. Pomona Jour. Ent. Vol. I, No. I, pp. 1-4, figs., 1-2.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.80 — 2.12 mm. Color in life not recorded, apparently without cape, apparently quite similar in color to *E. californica* and taken for that species. Antennal segments one, two, and basal portion of three concolorous with head, remaining portion of antennae dusky. Tibiae of all legs quite uniform in color, except for a slightly dusky area near apex. Tarsal segments concolorous with ends of tibiae.

Length of antennal segments as follows: III .18 mm., IV .09 mm., V .08 + .03 mm. Fourth and fifth antennal segments with primary sensoria. Hair on antennal segments extremely short and fine, also very sparse. Rostrum extending to mid-portion or slightly beyond the metathoracic coxae. Prothoracic femora .375 mm. in length, provided with few hairs which vary in length from .02 — .03 mm. on dorsal margin, where they are slightly dull at the apex. Hairs on ventral margin of prothoracic femora about twice as long, finer and sharp pointed. Prothoracic tibiae .45 — .48 mm. in length, hairs on this segment fairly numerous, those on outer margin varying from .015 mm. near the base to .045 near the apex, where the hairs on the outer margin are the longest, however even here the hairs are shorter than the width of tibiae. All hairs on the outer margin of the tibiae are coarse and dull at the apex, with the exception of one or two hairs near the apex. The basal hairs on this margin are spaced much further apart than their length. Remaining surface of this segment provided with finer

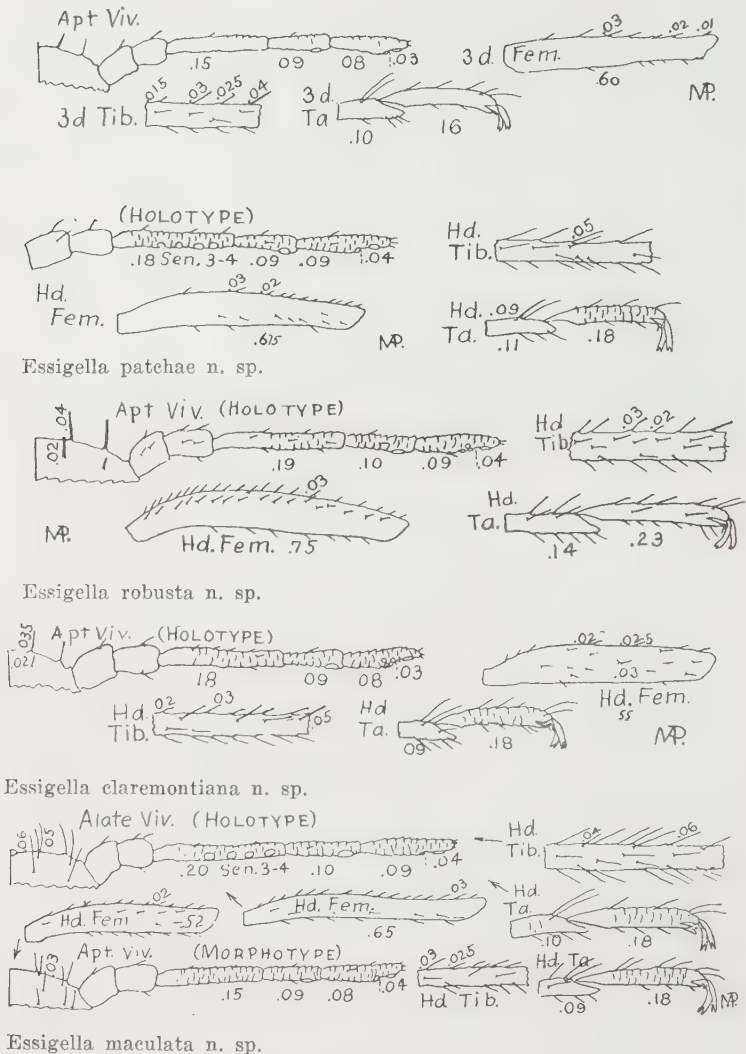


Plate IV

sharp pointed hairs, which show less variation in length than those on the outer margin.

Near the apex of the tibiae on the inner margin there is a brush of short fine hairs, the hairs on this segment are extremely few, those on the outer margin are very short, while those on the inner margin show considerable variation in length despite the fact that all are short, the

longest hairs being shorter than one-half width of tibiae. The hairs on the outer margin of the mesothoracic tibiae are coarse and distinctly capitate, those on the inner margin are fine and sharp pointed. The metathoracic femora vary in length from .55 — .67 mm. The dorsal margin of this segment is provided with coarse short hairs, which are dull if not actually capitate at the apex. They are spaced much further apart than their length. The hairs on the ventral margin, and lateral surfaces of this segment are only slightly finer, but are sharp pointed. Hairs on metathoracic tibiae varying in length from .015 mm. near the base to .045 mm. near the apex. These hairs are dull or capitate at the apex, and are rather coarse. The longest hairs at the apex are only slightly longer than the width of segment at this point. The hairs on the inner margin of the metathoracic tibiae are fewer in number than those on the outer margin. They are sharp pointed and shorter in length than the width of the tibiae. The metathoracic tibiae vary in length from .77 mm. to .90 mm. First metatarsal segment .09 mm in length, the dorsal surface of this segment has one pair of hairs, which are as long or longer than the width of segment, there are very few hairs on the ventral surface of this segment. Second metatarsal segment .18 mm. in length, both ventral and dorsal surfaces with very few, fine short hairs, the hairs near the apex being longest. Cornicles dusky, distinctly darker than the abdomen. Median posterior tubercle on cauda poorly developed. Both cauda and anal plate with long fine hairs.

This species may be differentiated at once from *E. californica* (Essig) by the shorter hairs on the tibiae, and by the hairs on the outer margin being blunt at the apex, and by fewer, shorter hairs on the femora. From *E. pini* Wilson it may be differentiated by a greater number of hairs on the metathoracic tibiae by the hairs being capitate, and by the poorly developed median posterior tubercle on the cauda. From apterous forms of *E. patchae* it differs in having a longer third antennal segment, shorter first and longer second metatarsal segments, in length of hind tibiae and in having shorter hairs on the basal region of outer margin of tibiae.

Holotype, apterous viviparous female, in the collection of the United States National Museum. Host, *Pinus radiata*, February 14, 1909, Claremont, California. It will be noted that the data associated with this slide is the same as that associated with "type slides" of *E. californica* (Essig). The slide was determined as *Essigella californica* (Essig), and the printing on the original label which is in poor condition appears to be that of Essig, but the two labels on this slide differ from those on "cotype" slides which I suspect are not original. None of the adults indicated as cotypes now in the Essig collection belong to this species.

I have seen two other slides, both in the United States National Museum. One, 124083 "on needles of Monterey Pine" det. as *Essigella californicus*, Claremont, California, but with no other data, I take it to be of the original material, and the printing is that of Essig. The other slide carries only the name *Essigella californicus* Essig, and California.

E. cocheta n. sp.

Plate I

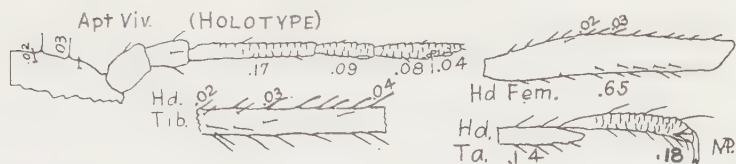
Apterous viviparous female

Length from vertex to end of anal plate varying from 1.97 — 2.25 mm. Color not recorded from life, cleared specimens are pale yellowish dusky, femora pale yellowish shaded with dusky, tibiae dusky tan uniform throughout, tarsal segments concolorous with tibiae. First antennal segment pale dusky, second segment and basal two thirds of the third segment pale, remaining antennal segments dusky. Cape hardly differentiated from rest of abdomen but slightly darker.

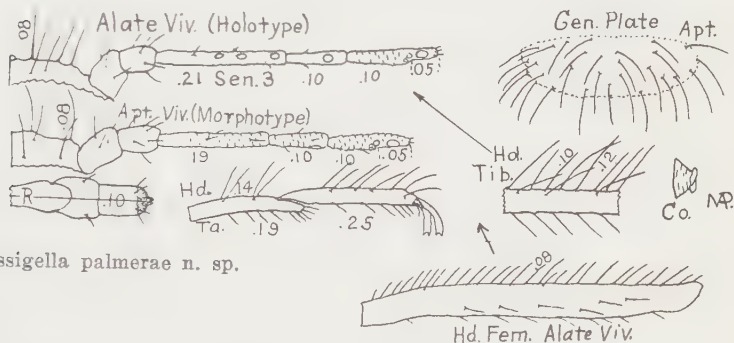
Anterior margin of head with hairs about .05 mm. in length. Length of antennal segments as follows: III .195 — .225 mm., IV .105 mm., V .09 — .105 + .03 mm.

There are no sensoria on the third antennal segment, the primary sensoria on the fourth and fifth antennal segments are small and not tuberculate, that on the fifth segment located very close to the end of the unguis. Antennal hair sparse, short and fine. Rostrum when extended reaching to the middle of metathoracic coxae. Length of pro, meso and metathoracic femora as follows: .45, .375, and .70 mm. Length of pro, meso, and metathoracic tibiae as follows: .555, .60, and 1.08 mm. Length of first and second tarsal segments of the metathoracic legs as follows: .105 and .165 mm. Prothoracic femora with hairs on dorsal margin .045 mm. in length, not numerous, these hairs taper to a moderately dull apex, remaining hairs on this segment somewhat finer and slightly longer. Hairs on outer margin of prothoracic tibiae .03 mm. in length with somewhat shorter hairs near the base, and slightly longer hairs near the apex. Only the hairs near the apex on the outer margin are sharp pointed, the other hairs being moderately dull.

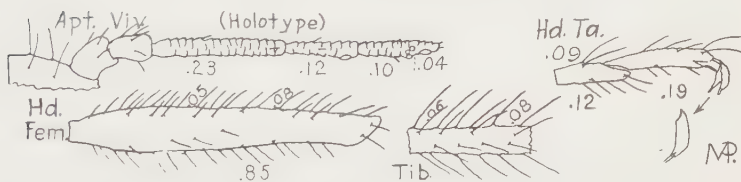
Hairs on inner margin of prothoracic tibiae fine, sharp pointed, and for the most part shorter than those on the outer margin. The hairs on the dorsal margin of the mesothoracic femora are about .015 mm. in length, fine and sharp pointed, remaining hairs on this segment are slightly longer and finer, with the hairs on the ventral margin longest, as well as fewest. The hairs on the outer margin of the mesothoracic tibiae are dull at the end and vary from .015 mm. to slightly less in length. The hairs on the inner margin are finer but about the same length, they are also sharp pointed. The hairs on the dorsal margin of the metathoracic femora are not numerous, being limited to about two rows, they are about .045 mm. in length, slightly coarse, tapering to a dull point, remaining hairs on this segment slightly longer, finer and definitely sharp pointed. The hairs on the ventral margin of the metathoracic femora are sparse, but by far the longest hairs on this segment. Metathoracic tibiae with fairly numerous hairs on the outer margin, the hairs vary in length from .015 — .075 mm. They are rather up-standing, coarse and definitely dull at the end. Hairs on the inner margin of the metathoracic tibiae measure up to .075 mm. in length with the hairs near the apex of segment shortest, the hairs on this margin are slightly finer, not quite so numerous and sharp pointed. The first tarsal segment has one pair of hairs on the dorsal surface, the hairs are rather coarse and longer than the width of segment. The



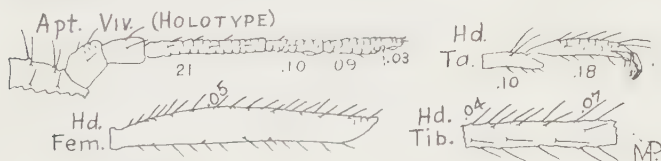
Essigella knowltoni n. sp.



Essigella palmerae n. sp.



Essigella monelli n. sp.



Essigella cocheta n. sp.

Plate V

hairs on the dorsum of the second metatarsal segment are no longer than the width of segment, those on the ventral surface of this segment are fine and short. Tarsal claws not definitely divided at the end, appearing as though only one of the bifurcations developed, the other remaining rudimentary.

Hairs on dorsum of abdomen in transverse rows, short, sparse, sharp

pointed. Hairs just anterior to cauda coarser and darker than others. Genital plate longer than wide with sides only slightly wavy but with no teeth. Cauda and anal plate normal.

Holotype, apterous viviparous female, mounted on same slide as holotype of *E. monelli* and with the same data.

This species shows much in common with *E. monelli*, differing in the shorter leg segments, shorter hairs, and fewer hairs on dorsal margin of metathoracic femora. It may be differentiated from *monelli* by the hairs on the dorsal surface of the second metatarsal segment being shorter than the width of segment.

Several specimens of this species are mounted on the Holotype slide.

Essigella essigi n. sp.

Plate II

Alate viviparous female

Length from vertex to end of anal plate varying from 1.61 — 1.82 mm. Color in life not recorded. Mounted, cleared specimens indicate the head and thorax as pale dusky, the abdomen may be either pale green or yellowish with transverse rows of small pigmented spots. Cauda and anal plate dusky. Antennae concolorous with head, as a rule with the base of the third segment pale. Legs pale dusky, quite uniform in color. Costal margin of wing pale dusky.

Antennal segments with the following lengths: III .16 mm., IV .07 mm., V .08 + .03 mm. The segments showing very little variability as to length. Third antennal segment with from one to three sensoria. All antennal segments imbricated. Antennal hair sparse and minute. Anterior margin of head with a few short blunt hairs. The rostrum reaches to the metathoracic coxae. Dorsal margin of metathoracic femora with short, blunt curved hairs, the hairs being spaced about a hair length apart, other hairs on this segment sharp pointed and sparse. Prothoracic femora about .30 mm. in length, with numerous sharp pointed hairs. Prothoracic tibiae with numerous hairs, those on the outer margin shorter than the others and dull at the end, all hairs on this segment much shorter than the width of segment. Mesothoracic femora about .24 mm. in length, fewer hairs than in the case of the prothoracic femora. Metathoracic femora varying from .50 — .52 mm. in length. Metathoracic tibiae varying from .63 — .67 mm. Hairs on outer margin of hind tibiae much shorter than width of tibiae, rather coarse, and dull at the end, remaining tibial hairs slightly longer, but still shorter than width of segment, sharp pointed. Hairs on inner margin of tibiae fewer than those on outer margin. First tarsal segment .08 mm. in length, second metatarsal segment .16 mm. long. Dorsal surface of first segment with two hairs, which are about twice as long as the width of segment and dull at the end. Costal margin of wings slightly fuscous. Media simple, with one or two exceptions, and these abnormal in some respect. Most specimens show the stigma and the cell formed by the radial sector continuous and of the same color.

Cornicles mere rings. Cauda with distinct median tubercle. Genital plate with hairs evenly distributed over the surface.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.57 — 1.82 mm. Color not recorded. Head and prothorax dusky brown, remainder of thorax and abdomen with a deep dusky brown cape. Color of remaining structures much as in alate viviparous female.

Antennal segments with the following lengths: III .13 mm., IV .07 mm., V .08 + .03 mm. The segments show almost no variation. The third and fourth antennal segments show no sensoria. The sensorium on the fifth segment is on the unguis. The rostrum reaches to the metathoracic femora. Hairs on prothoracic femora much shorter than the hairs on this segment in the alate female. Dorsal margin of the metathoracic femora with rather short curved hairs, spaced slightly farther apart than their length, these hairs are dull at the tip. The average length of the prothoracic femora is .26 mm., the average length of the mesothoracic femora is .23 mm. In length the metathoracic femora vary from .345 — .45 mm. The metathoracic tibiae are about .51 mm. in length. All hairs on the tibiae are short, those on the outer margin are dull at the tip, they are also rather thick. Remaining features as in the alate viviparous female.

Holotype, alate viviparous female. Morphotype, apterous viviparous female. Both types returned to the collection of E. O. Essig. Host, *Pinus radiata*, Redwood City, California, June 10, 1939. Collected by L. Blanc.

I am sure that specimens of this species were part of the original material from which Essig described *Lachnus californicus*, although there is no actual proof in the remaining cotype material. That this supposition is most likely true is strongly suggested by Essig's illustrations fig. 2, which fail to indicate the long hairs on the tibiae. Essig's figure of the alate of *californicus* is not of this species, as is indicated by the wings, nor does this species appear to have been present in the material when *californicus* was described for the second time in part ten of "Aphididae of Southern California."

E. essigi may be differentiated from *E. californica* (Essig) as here restricted by the shorter hairs on the tibiae, and by the fact that some hairs are blunt. The wings of the alates differ. *E. essigi* also has a distinct cape.

Slides seen:

Sixteen paratype slides with same data as types. *Pinus radiata*, Stanford University, California, April 25, 1930. P. S. B. *Pinus coulteri*, Stanford University, California, March 8, 1931, P. S. B. *Pinus* sp. Imperial County, California, May 1, 1953, Ed. Fish. Twelve slides, Pine, Los Angeles, California, Lot 44 - 1199, United States National Museum. *Pinus tuberculata* Feliciana Mt. Mariposa County, California, July 25, 1946 H. P. Chandler *Pinus radiata*, Berkeley, California, November 10, 1935, E. O. Essig.

Essigella fusca Gillette and Palmer

Plate VI

Essigella fusca Gillette and Palmer, 1924: 6 (original description) and 1931: 839 (in part).

Apterous viviparous female

Length from vertex to end of anal plate approximately 2.10 mm. Color of body deep dark blackish brown. Dark color due to color of cape for most part but ventral surface is also dark. Femora similar to color of body, tibiae dark brownish dusky, tarsal segments concolorous with ends of tibiae. Antennal segments with the following lengths: III .18 mm., IV .10 mm., V .09 + .4 mm. Hairs on first and second antennal segments long, some hairs on second segment almost half as long as width of segment. Hair on other antennal segments sparse, but rather coarse. Hairs on anterior margin of head about .06 mm. in length, rather coarse. Rostrum extending to coxae of metathoracic legs. Lengths of pro and metathoracic femora .55 and .90 mm. Lengths of pro and metathoracic tibiae .675 and 1.20 mm. Hairs on prothoracic femora coarse, on dorsal margin about .06 mm. in length. Hairs on

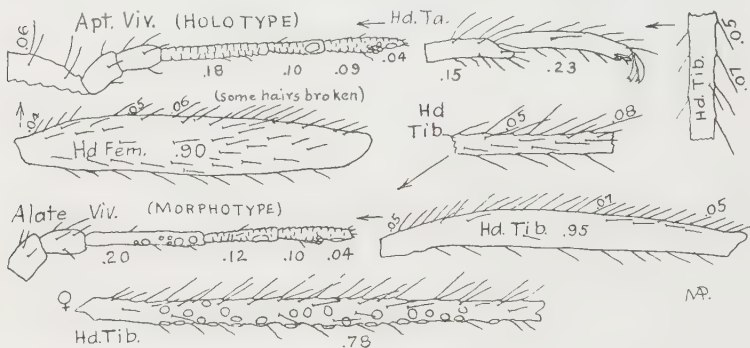
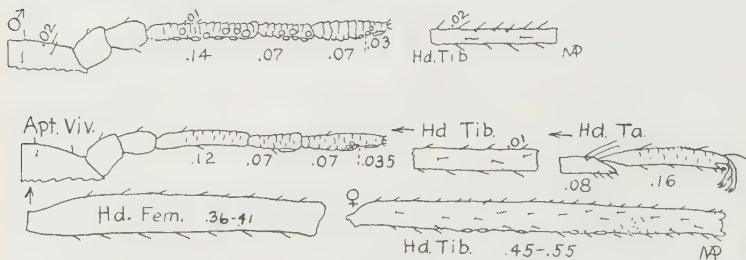
*Essigella fusca* Gillette and Palmer*Essigella hoerneri* Gillette and Palmer

Plate VI

outer margin of prothoracic tibiae about .075 mm. in length, coarse, rather dull at the apex. Hairs on inner margin of prothoracic tibiae few, widely spaced, sharp pointed, much shorter than width of segment, in contrast to the hairs on the outer margin which are slightly more than two times width of segment. Hairs on outer margin of mesothoracic tibiae shorter than width of segment and almost capitate at the apex. Dorsal margin of metathoracic femora with hairs varying from .05 — .06 mm. in length, fairly numerous. Hairs on outer margin of metathoracic tibiae varying in length from .05 — .08 mm. coarse hairs on inner margin of metathoracic tibiae few, shorter than width of segment, and for the most part spaced further apart than their length. Metatarsal segments .15 and .23 mm. in length. Dorsal surface of all first tarsal segments with two pairs of hairs. Hairs on dorsal surface of second metatarsal segment about two times width of segment in length. Dorsum of abdomen with comparatively few short coarse hairs which arise from small pigmented spots, on the anterior portion of the abdomen these hairs are arranged in irregular transverse rows, near the posterior the hairs are scattered. Hairs near posterior of abdomen, and those on cauda and anal plate coarse. Cornicles not differentiated in color from cape.

Alate viviparous female

Length from vertex to end of anal plate approximately 2.70 mm. Color not recorded but not nearly so dark as the apterous viviparous females. Antennal segments with the following lengths: III .20 mm., IV .12 mm., V .10 + .04 mm. Third antennal segment with from three to four normal sized sensoria and about four very much smaller sensoria. Hairs on first and second antennal segments very well developed, remaining antennal segments with normal hair. Anterior margin of head with hairs about .09 mm. in length. Lateral lobes of thorax with hairs confined largely to inner portion of lobes. Median posterior lobe of thorax with very few hairs. Prothoracic femora varying in length from .52 — .60 mm. provided with numerous hairs of about equal length. Prothoracic tibiae varying from .60 — .69 mm. in length, with the hairs on the outer margin about .08 mm. long, hairs on inner margin shorter than width of segment, few, and less coarse than the hairs on the outer margin. Mesothoracic femora with fewer and much shorter hairs on the prothoracic femora. Mesothoracic tibiae with hairs few and shorter than width of segment on both margins, hairs on inner margin much fewer and finer than the hairs on the outer margin. Hairs on dorsal margin of metathoracic femora numerous, varying in length from .05 — .07 mm. Some of the remaining hairs on this segment longer than the longest on the dorsal margin. Hairs on outer margin of metathoracic tibiae coarse varying in length from .05 — .08 mm. Hairs on inner margin of this segment fewer, finer and shorter than width of segment. The hairs on the outer margin of the metathoracic tibiae are almost dull at the apex, those on the inner margin are sharp pointed. Metatarsal segments .15 and .225 mm. in length. All first tarsal segments with two pairs of hairs on the dorsum. Dorsum of abdomen with numerous pigmented spots, each provided with a hair. The spots vary in size. They are arranged in irregular transverse rows, and some may be joined to produce a spot which is two or three times longer

than wide. Cornicles pigmented rings. Cauda and anal plate with numerous coarse hairs.

The original description of this species was based on two species as is indicated from the description and an examination of the type material. Palmer's 1952 description under this name also applies to two species. Knowlton's records probably apply only to the form here described as *E. agilis*. The name *E. fusca* in this paper is restricted to specimens which agree with the lectotype, an apterous viviparous female, in the United States National Museum, indicated as "type" by Palmer 1952. This form and oviparous females as well, have a very dark cape, referred to in the original description of the viviparous female as "marked on entire dorsum by solid dusky patch."

Part of the original description of the apterous viviparous female applies to the species described as *E. agilis*. The original description of the alate viviparous female applies only to specimens of *E. fusca* for specimens from which the description of this form was made were offspring of the lectotype. The original description of the male most likely applies to the male of *E. agilis*. The original description of the oviparous female is that of *E. agilis*, but specimens of this form which belong to *E. fusca* have a very dark cape, similar to that of the apterous viviparous females. The specimens mentioned as being taken by Bragg in Denver are not of this species.

This species is most likely closely allied to *E. palmerae* from which apterous specimens may be differentiated by the presence of the very dark cape. Both apterous and alate specimens differ from similar specimens of *E. palmerae* by the much shorter hairs on the femora and tibiae, and shorter tarsal segments.

Holotype apterous viviparous female, United States National Museum No. 41953. Host, *Pinus ponderosa* Rocky Mt. National Park. (Craggs Hill, near Bald Pate Inn) July 12, 1923, Coll. M. A. Palmer. Morphotype, alate viviparous female, same host, reared from lectotype, July 27, 1923, Coll. M. A. Palmer.

Essigella gillettei n. sp.

Plate III

Essigella californica (in part) Essig, E. O. Aphididae of Southern California X. Pomona College Journal of Entomology 1912 Vol. IV pp. 780-785.

Essigella californica Palmer, 1952, p. 14

Apterous viviparous female

Length varying from 1.87 - 2.25 mm. Color pale green, speckled with dusky at base of hairs, legs and antennae pale dusky. Length of antennal segments as follows: III .20 - .21 mm., IV .12 - .13 mm., V .09 - .10 + .02 mm. There are no secondary sensoria. Lengths of pro meso and metathoracic femora varying as follows: .45 - .47 mm., .37 mm., .67 - .82 mm. Lengths of pro meso and metathoracic tibiae varying as follows: .51 - .57 mm., .50 - .60 mm., 1.02 - 1.05 mm. Hairs on anterior margin of head coarse and about .06 mm. in length. Hairs on outer margin of prothoracic tibiae numerous and about .075 mm. in length, much longer than width of tibiae, and much longer than hairs on inner

margin. Hairs on prothoracic femora about .06 mm. length. Hairs on mesothoracic femora few and much shorter than the hairs on the prothoracic femora. Hairs on outer margin of mesothoracic tibiae few and about one and a half times width of segment. Hairs on inner margin of mesothoracic tibiae hardly half width of tibiae in length. Hairs on dorsal margin of metathoracic femora about .07 mm. in length, coarse, numerous, longer and coarser than other hairs on this segment. Hairs on outer margin of metathoracic tibiae varying in length from .06 mm. near base to .09 mm. near middle. The hairs on this segment are numerous, coarse and sharp pointed. Hairs on inner margin of metathoracic tibiae few, hardly equal to width of segment and quite upstanding. First tarsal segment of pro and mesothoracic legs with one pair of hairs on the dorsum, this segment of the metathoracic legs has two pairs of hairs. Hairs on dorsum of second metatarsal segment much longer than width of segment. Median posterior tubercle on cauda moderately well developed.

Alate viviparous female

Length varying from 1.80 -2.40 mm. Head and thorax dusky, abdomen pale green, with very pale pigmented spots arranged in transverse rows. First and second antennal segments concolorous with head, base of third antennal segment pale, remainder of antennae dusky. Legs dusky with the metathoracic legs darkest. Antennal segments with the following lengths: III .25 mm., IV .15 mm., V .13 + .02 mm. Third antennal segment with from two to four sensoria. Lengths of pro meso and metathoracic femora as follows: .55 - .63 mm., .37 .45 mm., .97 - 1.05 mm. Lengths of pro meso and metathoracic tibiae varying as follows: .67 - .72 mm., .71 - .75 mm., 1.42 - 1.72 mm. Lengths of metathoracic tarsal segments .15 and .21 mm. Prothoracic femora with numerous hairs over all of surface, the hairs being about .07 mm in length. Mesothoracic femora with few short fine hairs, the hairs being not much longer than .02 mm. Dorsal margin of metathoracic femora with numerous long coarse hairs which are about .07 mm. in length, hairs on ventral surface of this segment much shorter and finer in texture, also fewer in number. Hairs on outer margin of prothoracic tibiae numerous about .10 mm. in length, hairs on inner surface of this segment fewer and hardly as long as width of segment. Hairs on outer margin of mesothoracic tibiae about one-third longer than width of segment, hairs on inner margin of this segment shorter than width of segment. Hairs on outer margin of metathoracic tibiae numerous, long and fine, sharp pointed. The hairs on this margin are about three times the width of segment in length and vary from about .09 mm. near the base to about .12 mm. near the middle of segment. Hairs on inner margin of metathoracic tibiae few, upstanding, fine and short. Metathoracic tarsal segments .15 mm. and .21 mm. in length. The dorsum of the first metatarsal segment has two pairs of hairs, the first tarsal segments of the other legs has only one pair of hairs. Media once branched. Dorsum of abdomen with from three to four rows of small pigmented spots each giving rise to a short hair. Cornicles dusky. Cauda and anal plate dusky. Median posterior tubercle on cauda not well developed.

This new species has been recorded in aphid literature in part by

Essig in his redescription of *E. californica* in part X of his "Aphididae of Southern California." The records to *E. californica* (Essig) of Gillette and Palmer, of Palmer, and of Knowlton refer to this species. It is suspected that part of the material described by Wilson under the name *E. californica* belonged to *E. gillettei*. Gillette and Palmer and Palmer 1952 have described all forms of this species. This species is allied to *E. californica*, and differs from it, in longer antennae, longer legs, longer and more upstanding hairs on tibiae, longer hairs on dorsum of metathoracic femora, longer tarsal segments

Holotype, alate viviparous female, taken on *Pinus murrayana*, Stove Prairie Hill, Bellevue, Colorado, June 16, 1922, Coll. M. A. Palmer. Morphotype apterous viviparous female, same data as holotype except for date June 14, 1922 Coll. by M. A. Palmer and M. F. C. Both types deposited in the United States National Museum. *Pinus murrayana* the host recorded for this species by Gillette and Palmer is a synonym of *Pinus contorta*. This species has also been taken on *Pinus ponderosa*, *Pinus radiata* and *Pinus albicaulis*.

Part of the material taken by Essig on *Pinus radiata* June 26, 1911 at Santa Paula, California and recorded by him under the name *E. californica* and the number "47" is of this species. L. G. Gentner took this species on *Pinus albicaulis* October 2, 1956 at Crater Lake, Oregon.

Essigella hoerneri Gillette and Palmer

Plate VI

Essigella hoerneri Gillette and Palmer, New Colorado Lachnini. Annals Entomological Society of America Vol. XVII pp. 5 - 6, 1924. Original description.

The type slide of this species, on which the lectotype is indicated is in the United States National Museum. It has been seen, together with several slides indicated as paratypes. I collected this species for the first time since 1922 in the summer of 1956 after looking for it for years. As indicated by Palmer in Aphids of the Rocky Mountain Region, it was abundant. I was attracted to the tree on which I collected the specimens by a flock of small birds which I suspected of feeding on a species of *Cinara*. Not finding specimens of that genus, I directed my search to *Essigella* which I found without difficulty. This was early in July, from this time onwards specimens were reared on twigs, and followed on the tree on which they had been taken originally some miles north of Rifle, Colorado, to the time when the sexual forms were produced. At no time were alate specimens produced, I suspect they are produced but once a year, perhaps the second generation.

Apterous male

Length from vertex to end of anal plate .975 mm. Head and thorax pale greenish dusky, abdomen pale green, free from pigmented spots. First antennal segment pale, third segment pale at base, remainder of antenna dusky. All femora and tibiae pale, tarsal segments light dusky. Length of antennal segments as follows: III .14 mm., IV .07 mm., V .07 + .03 mm.

Third antennal segment with 7 - 10 small tuberculate sensoria. Fourth antennal segment with 4 - 7 small sensoria. Metathoracic femora .30 mm. in length, length of metathoracic tibiae .465 mm. Length of first metatarsal segment .06 mm., length of second metatarsal segment .135 mm. Anterior margin of metathoracic femora with a row of very short hairs, remainder of segment with very few hairs. Hairs on metathoracic tibiae similar to those of apterous females. Dorsum of first tarsal segment of pro and mesothoracic legs with one pair of hairs, dorsum of metathoracic first tarsal segment with two pairs of hairs.

Apterous viviparous female

Gillette and Palmer, and Palmer 1952 have described the apterous viviparous and oviparous females of this species. Length from vertex end of anal plate from 1.375 - 1.5 mm. Head and thorax very pale dusky, abdomen pale green, with cape extremely pale dusky, always present but at times difficult to differentiate, nor is the cape of the abdomen always continuous, at times taking the form of broad transverse bands. Antennal segments with the following lengths: III .12 mm., IV .07 mm., V .07 + .035 mm. Lengths of pro meso and metathoracic femora as follows: .33 mm., .325 mm., .36 - .36 mm., .33 mm., .48 - .55 mm. meso and metathoracic tibiae as follows: .30 - .36 mm., .33 mm., .48 - .55 mm. Vertex of head with a few very short blunt hairs. Hairs on antennal segments extremely sparse, and very very short, but at the same time coarse. Imbrications on antennal segments very coarse, and wide apart. Rostrum with last three segments extending beyond metathoracic coxae. Dorsal margin of metathoracic femora with few hairs, the hairs being slightly curved and spaced further apart than their length, but little longer than the hairs on the vertex of the head and dull at the apex. Remaining hairs on the metathoracic femora slightly longer and sharp pointed. Hairs on tibiae comparatively few, short, about .01 mm. in length or slightly longer near the apex of the segment, spaced as a rule further apart than their length, and much the same on both outer and inner surfaces. Metatarsal segments with the following lengths: .08 and .16 mm. first segment of this pair of legs with two pairs of hairs on the dorsum, the more basal pairs of hairs being shorter and finer than the hairs closer to the apex, and much harder to differentiate, therefore very apt to be overlooked or suspected of being missing. First tarsal segments of pro and mesothoracic legs with only one pair of hairs on the dorsum. Genital plate deeply excavated in mid anterior region, sometimes almost divided. Hairs on ventral surface of abdomen not numerous but confined to slightly pigmented transverse bands, much longer than hairs on the dorsum which are exceedingly short, few, and scattered over the surface. Cauda with median posterior tubercle only slightly developed, but always visible.

The host of this species is *Pinus edulis*. Palmer also records *Pinus ponderosa* and *Pinus flexilis*. The holotype is in the United States National Museum. Male reared on *Pinus edulis*, taken October 3, 1956, Grand Junction, Colorado, lost in process of repairing slide. The male was reared from specimens taken north of Rifle, Colorado. The drawings of the viviparous and oviparous females are from paratype specimens in the Colorado collection.

Slides of this species seen as follows: Lectotype with the following

data: *Pinus edulis*, Owl Canyon, Larimer County, Colorado, September 25, 1921 J. L. Hoerner in United States Natural Museum.

Pinus edulis, Owl Canyon, Larimer Co., Colorado, September 25, 1921, September 28, 1921, November 6, 1921. The slide taken November 6th contains the oviparous female drawn and indicated as morphotype by Professor Palmer. *Pinus flexilis*, Estes Park, Colorado, July 22, 1922, slide indicated as metatype. *Pinus edulis*, Rifle, Colorado, August 17, 1956, Grand Junction, Colorado, September 2, 1956, September 10, 1956, September 21, 1956.

***Essigella knowltoni* n. sp.**

Plate V

Essigella pini Wilson (in part) Palmer 1952 p. 16

Apterous viviparous female

Length from vertex to end of anal plate varying from 1.82 - 2.10 mm. Color in life not recorded. Mounted specimens which have not been cleared show the head dusky yellow, this continues on to the prothorax, remainder of body dark brown, the brown being in the form of a cape which continues on to the ventral surface of the abdomen. First, second and basal third of third antennal segments pale, remainder of antennae pale dusky. Femora and tibiae of prothoracic legs dusky and quite uniform in color. Mesothoracic femora and tibiae quite similar to these segments on the prothorax. Metathoracic femora and tibiae dusky throughout, darker than segments on anterior legs, with dorsal margin of femora darkest. All tarsal segments dusky, slightly darker than ends of tibiae. Cornicles not differentiated from cape, situated on distinctly raised areas.

Antennal segments with the following lengths: III .165 - .17 mm., IV .075 - .09 mm., V .08 + .04 mm. Third segment without sensoria, fourth and fifth segments with primary sensoria. Hair on antennae minute. Rostrum when extended reaching to end of metathoracic coxae. Hair on anterior margin of head .03 mm. in length and dull at the apex, hair on dorsum of head very sparse, of varying lengths, the longest .045 mm. Some of these hairs are sharp pointed. Prothoracic femora .33 mm. in length, provided with fairly numerous fine sharp pointed hairs, the hairs on the dorsal margin being slightly shorter than the others. Length of prothoracic tibiae .45 mm. provided with numerous hairs, those on the outer margin increasing slightly in length from base to apex, the longest shorter than width of segment, all hairs on this surface dull at the apex. Hairs on inner margin of prothoracic tibiae sharp pointed and decreasing in length from base to apex of segment. Mesothoracic femora .375 mm. in length, length of mesothoracic tibiae .57 mm. Hair on these segments much shorter than hair on similar segments of prothorax, but hair like that on anterior tibiae in character. Length of metathoracic femora varying from .65 - .675 mm. provided with short bluntly pointed hairs on the dorsal surface, hairs on remainder of femora sharp pointed and slightly longer. Metathoracic tibiae varying in length from .93 - .96 mm. The hairs on the outer margin of this segment vary in length from .02 - .04 mm., all but the longest near the apex are blunt at the end or slightly capitate, the longest hairs are almost sharp pointed, in length they are

slightly longer than the width of segment. The hairs on the inner surface of the hind tibiae are all sharp pointed. They vary in length, all are shorter than the width of the segment, and may be spaced one short and one long. First metatarsal segment .14 mm. in length, length of second segment .15 - .18 mm. Dorsum of first tarsal segment with one pair of hairs, on the lectotype these hairs are slightly longer than the width of segment and dull at the end. Hairs on the ventral and dorsal surfaces of the second metatarsal segment short and fine. Hair on dorsum of abdomen exceedingly sparse, and short, not arranged in regular rows. Genital plate broadly transverse, provided with a moderate number of fine, sharp pointed hairs, which cover most of the surface. Median posterior tubercle on cauda not well developed. Both cauda and anal plate provided with long, fine hairs.

This species is perhaps most closely allied to *E. essig* from which it may be differentiated by its longer legs, brownish not dusky cape, longer hairs on tibiae and by the fact that the prothoracic tibiae are distinctly longer than the prothoracic femora. From *E. fusca* Gillette and Palmer this species differs as follows: shorter and almost capitate hairs on dorsal margin of metathoracic femora, shorter and blunter, with some capitate hairs on outer margin of metathoracic tibiae, and cape not so dark.

Holotype, apterous viviparous female, deposited in the United States National Museum collection. Host, *Pinus contorta*. Taken by G. F. Knowlton, Pingree Park, Colorado, August 23, 1935 and determined by him as *E. fusca* Gillette and Palmer. Specimens determined by Palmer as *Essigella pini* Wilson from Cameron Pass, Colorado are of this species.

Slides seen in addition to type: Two paratype slides with same data as type, except date August 19, 1935. Two paratype slides, August 18, 1940, *Pinus contorta* G. F. Knowlton, Cameron Pass, Colorado. One slide *Pinus*, Logan Canyon, Utah, August 24, 1934 G. F. K., and T. O. T.

Essigella maculata n. sp.

Plate IV

Alate viviparous female

Length from vertex to end of anal plate 2.13 mm. Head and thorax pale dusky green, mid dorsal region of thorax distinctly brown. Abdomen very pale green, free from spots. Antennal segments one and two almost concolorous with head, remaining antennal segments dusky except for base of third segment which is pale. Prothoracic femora pale dusky, except for basal fourth which is slightly paler, tibiae of the same pair of legs dusky, slightly darker at end. Metathoracic femora very pale, tibiae of same legs almost uniform dusky. Tarsal segments concolorous with end of tibiae.

Anterior margin of head with few distinctly spine like hairs, which very in length from .05 - .06 mm. these hairs are dull at the end. Length of antennal segments as follows: III .20, IV .10 mm., V .09 + .04 mm. Third antennal segment with from three to four sensoria. Remaining antennal segments distinctly imbricated, except the first and second. Hair on antennae almost absent, shorter than space between imbrications. Both margins of prothoracic femora with similar hairs, the hairs being fine, sharp pointed, and about .045 mm. in length. The hairs on the pro-

thoracic femora are not numerous, but are spaced closer together than their length. Outer margin of prothoracic tibiae with coarse hairs, the hairs are dull at the apex and about .045 mm. in length, the hairs on the inner margin of this segment are only half as long as the hairs on the outer margin, and distinctly shorter than this near the apical third of segment. Inner apex of prothoracic tibiae with brush made up of very short fine hairs. Media simple, very faint. Prothoracic femora .405 mm. long. Length of prothoracic tibiae .495 mm. Metathoracic femora .675 mm. in length. Hairs on dorsal margin of metathoracic femora more numerous than hairs on ventral margin, they are fine and very short. Metathoracic tibiae 1.00 - 1.05 mm. long, provided on outer margin with hairs which vary from .04 - .06 mm. in length, these hairs are slightly dull at the apex. Inner margin of metathoracic tibiae with hairs on basal three fourths of segment similar to those on outer margin, but distinctly sharp pointed, fewer than those on outer margin. Hairs on apical fourth of segment distinctly shorter, finer and slightly more droopy. Inner apex of metathoracic tibiae with brush. Dorsum of first tarsal segment with one pair of hairs, hairs on ventral surface of this segment few, short and fine. Hairs on dorsal surface of second metatarsal segment less than two times length of hairs on ventral surface, hairs on both dorsal and ventral surfaces few.

Cornicles not differentiated from abdomen except as rings. Cauda with small median posterior tubercle. Anal plate and cauda with setulae, both with few hairs. The long hairs on the cauda confined largely to the posterior surface, there are a few much shorter hairs anterior to these, ventral surface of cauda with hairs somewhat shorter. Genital plate small, not much wider than deep, with few hairs.

Apterous viviparous female.

Length from vertex to end of anal plate 1.68 mm. Color pale green. Femora, tibiae and tarsal segments pale dusky.

Head and thorax.—Anterior margin of head with a few dull short spine like hairs. Antennal segments with the following lengths: III .15 mm., IV .09 mm., V .08 + .04 mm. There are no secondary sensoria. Antennal segments almost without hair. Segments three, four and five coarsely imbricated. Rostrum reaching well beyond metathoracic coxae. Prothoracic femora .375 mm. long, provided with few comparatively short hairs which are similar on both dorsal and ventral surfaces, and varying in length from .01-.035 mm. the long and the short hairs being intermixed, most of the long hairs being dull at the end. First segment of prothoracic and metathoracic tarsi with two pairs of hairs on the dorsum, this segment of the mesothorax has only one pair of hairs on the dorsum. Metathoracic femora .52 mm. in length, provided with comparatively few hairs, the hairs on the dorsal margin being the more numerous. Metathoracic tibiae .825 mm. in length, hairs on outer margin spine like, blue at the apex, varying in length from .015-.03 mm. for the most part spaced farther apart than their length. Hairs on inner margin of tibiae fewer, sharp pointed, slightly shorter, than those on outer margin. First metatarsal segment .09 mm. in length. Second metatarsal segment .18 mm. long, with hairs on the dorsum but little longer than the hairs on the ventral surface.

Cornicles mere rings, slightly dusky. Dorsum of abdomen without

spots. Cauda and anal plate with setulae, both with hairs confined to posterior margins and ventral side. Cauda without median posterior tubercle.

Apterous viviparous females of this species differ from similar forms of *E. hoerneri* Gillette and Palmer by the longer hairs on the tibiae, by having the median tubercle lacking on the cauda, longer hairs on the vertex and longer tibiae.

Holotype, alate viviparous female, morphotype, apterous viviparous female, both deposited in the United States National Museum. Host, *Pinus edulis*, taken Sept. 2, 1956, Grand Junction, Colorado. Both reared from material collected north of Rifle, Colorado in July. This species was associated with specimens of *E. hoerneri*.

This species is known from only three specimens, one of which has been made paratype.

Essigella monelli n. sp.

Plate V

Apterous viviparous female.

Length from vertex to end of anal plate 2.36 mm. Color in life not recorded. The color of the body is pale yellowish dusky, with the cape only a shade darker than the body. Cornicles pale brown. Apex of third antennal segment and all of fourth and fifth segments pale brown. Femora pale buff with dorsal margins slightly darker. Tibiae pale dusky brown, uniform throughout, tarsal segments concolorous with apex of tibiae.

Antennal segments with the following lengths: III .23 mm., IV .12 mm., V .10 + .04 mm. Primary sensoria on fourth and fifth antennal segments small, not tuberculate. Third, fourth and fifth antennal segments strongly imbricated. Hairs on vertex of head tapering and about .06 mm. in length, they are slightly dull at the end. Remaining hairs on the head sharp pointed, longer and finer than those on the vertex. The rostrum is not in a position to measure. Length of prothoracic femora and tibiae .525 mm. and .65 mm. Length of mesothoracic femora and tibiae .42 mm. and .66 mm. Length of femora and tibiae of metathoracic legs .805 mm. and 1.215 mm. Dorsal margins of pro and mesothoracic femora with numerous, long, slightly dull or sharp pointed hairs, on the metathoracic femora these hairs vary from .05-.08 mm. in length, they are spaced closer together than their length. The hair on the mesothoracic femora are much shorter and fewer than those on the other femora. Hair on prothoracic tibiae numerous, those on the outer margin vary from about .06 mm.-.075 mm. they are rather coarse and dull at the tip, but not blunt. The hairs on the inner margin of the prothoracic tibiae are about .03 mm. long, much finer and sharp pointed, in contrast to the hair on the outer margin. The hairs on the mesothoracic tibiae are much fewer than those on the prothoracic tibiae, also shorter, those on the outer margin being about .03 mm. long, they are rather thick, of uniform width, and definitely dull at the end, the hairs on the inner margin are only slightly shorter, but finer and sharp pointed. For the most part the hairs on the mesothoracic tibiae are shorter than the space between them. Dorsal margin of metathoracic femora provided

with distinctly spine-like hairs which are definitely dull at the end if not slightly capitate, these hairs are fairly numerous, and vary in length from .05-.08 mm. remaining hairs slightly shorter and less spine-like. Metathoracic tibiae with numerous hairs, those on the outer margin are quite upstanding, varying in length from .06-.08 mm. and dull at the apex, if not slightly capitate, on the inner margin the hairs are shorter and finer than those on the outer margin and sharp pointed. All first tarsal segments with one pair of hair on the dorsal surface, the hairs being longer than the width of segment. Second metatarsal segment with hairs on the dorsum much longer than width of segment, hairs on ventral surface of this segment fine and short. All claws of this species differ from the usual condition found in this genus, by not being definitely divided at the apex, but with a single finger-like process at the end.

Abdomen.—Hairs on dorsum of abdomen just anterior to cauda slightly longer and thicker than remaining hairs on this surface.

Holotype, apterous viviparous female, in the collection of E. O. Essig. Host, *Pinus tuberculata*, Fort Bragg, California, May 8, 1936, E. O. Essig.

This species may be differentiated from all other known species within the genus except *E. wilsoni* and *E. cocheta* by the claws not being definitely bifurcate. From *cocheta* it may be differentiated by the longer segments of the legs, and longer hairs on the tibiae, as well as the more numerous hairs on the dorsal margin of the metathoracic femora. The hairs on the tibiae of *wilsoni* are much shorter than the hairs on this structure of *monelli* or *cocheta*.

Essigella palmerae n. sp.

Plate V

Alate viviparous female.

Length from vertex to end of anal plate 2.49 mm. Color in life not recorded. Mounted specimens show the head and thorax dark dusky brown, with the area median to the eyes somewhat lighter. Antennae with the exception of the pale-yellowish base of third segment dusky brown, to almost black. Femora yellow with dusky brown at apex and along anterior margins. Metathoracic femora lighter than other femora in color. All tibiae and tarsi black. Abdomen yellow, with pigmented spots, some of which are confluent, and for the most part moderately large. Cornicles located within pigmented spots and of the same brownish color. Between the cornicles there is a very irregular pigmented band, which has several clear areas. Some specimens may lack this cross band. Posterior region of abdomen, cauda and anal plate dark brown. Hairs on dorsum of abdomen limited to pigmented areas, those near the posterior end much darker and coarser than those more anterior.

Antennal segments with the following lengths: III .21 mm., IV .10 mm., V. 10 + .05 mm. The third segment has from two to three sensoria. All antennal segments with minute hairs, strongly imbricated. Width of head through the eyes .51 mm. Prothoracic femora very strongly developed, longer and wider than those of mesothorax, and with longer and more numerous hairs. Prothoracic tibiae with numerous hairs, those on outer surface longer and much coarser than those on inner surface.

Mesothoracic tibiae with hairs much fewer, finer and shorter than those on the prothoracic tibiae, the hairs much fewer, finer and shorter than those on the prothoracic tibiae, the hairs on the inner surface being especially sparse, fine and short. Metathoracic femora with dorsal margin with numerous, long, coarse hairs, ventral margin almost free from hairs, and these extremely fine and rather short. Hind tibiae 1.35 mm. in length. Hairs on hind tibiae numerous, varying in length from .10-.12 mm., much longer and coarser as well as more numerous on the outer margin than on the inner. All tibial hairs sharp-pointed. Apex of tibiae enlarged on the inner margin, this region has several fine short hairs. First tarsal segment with five long hairs on the dorsal surface, and as a rule five pairs of the short hairs on the ventral surface, these hairs do not extend the full length of the segment, but have their origin just beneath the first pair of hairs on the dorsal surface. The first tarsal segment varies from .18-.19 mm. in length. The second tarsal segment varies from .225-.25 mm. in length. The cornicles are mere rings. Lateral lobes of thorax with from 24-26 hairs, most of which are confined to the anterior and median region. The median posterior lobe of the thorax is free from hairs. Costal margin of wing smoky, stigma the same. Radial sector bordered with fuscous. Media once branched, very faint. Cubital and anal veins fuscous.

Apterous viviparous female.

Length from vertex to end of anal plate 2.55 mm. Color in life not recorded. Mounted specimens indicate that the color was mostly yellowish, perhaps slightly dusky due to a very pale dusky cape. Within the cape there are a few darker pigmented spots each of which gives rise to a short coarse hair. Antennal segments with the following lengths: III .19 mm., IV .09 mm., V .10 + .05 mm. The third segment is without sensoria, the fourth and fifth segments have primary sensoria, that on the fifth segment being located about midway on the unguis.

All antennal segments are strongly imbricated. The antennal hairs are minute and sparse. The rostrum reaches to the metacoxae. The metathoracic tibiae vary in length from 1.125-1.20 mm. Tibial hairs as in alate viviparous female, but the tibiae are not always so dark. The first tarsal segment is .167 mm. in length, the second is .225 mm. long. Cauda with a distinct wart, located in the middle of the posterior margin.

In Palmer's key to the genus *Essigella* in "Aphids of the Rocky Mountain Region" this species keys to *E. californica* (Essig). As indicated herewith *E. californica* (Essig) of Gillette and Palmer is not the species considered to be *californica* in this paper. It differs from the species considered such by Gillette and Palmer, by its larger size, longer tarsal segments, longer coarser hairs on tibiae and femora, and color of tibiae. From *E. fusca* Gillette and Palmer it differs in the tibial hairs not being blunt or slightly capitate, by the longer tibial hairs, and by the absence of the dark cape in the apterous females. Alates of this species differ from alates of *fusca* by having longer hairs on the femora and tibiae, longer tarsal segments and sharp-pointed hairs on the tibiae.

Holotype, alate viviparous female. Morphotype, apterous viviparous female. Both types mounted on the same slide, which has been deposited in the United States National Museum. Host, *Pinus ponderosa*. Summer-

haven, Arizona (near Tucson), Santa Catalina Mts., June 13, 1954.
F. C. Hottes.

The material seen consists of the types mentioned and several paratype slides, all taken June 13, 1954, with the Types.

Essigella patchae n. sp.

Plate IV

Essigella californica. Patch Bulletin No. 202 Maine Agricultural Experiment Station pp. 169-170, 1912 (misidentification)

Apterous viviparous female.

Length from vertex to end of anal plate approximately 2.17 mm. Color recorded by Patch as green with antennae and legs with dusky tips. Mounted specimens suggest that the color of the body was uniform throughout. Length of antennal segments as follows: III .15 mm., IV .09 mm., V .08 + .03 mm. There are no sensoria on the third antennal segment, the fourth and fifth antennal segments with only primary sensoria. Hair on third antennal segment almost absent, extremely short and fine when represented. Vertex of head with few thick blunt hairs which are about .015 mm. in length. Rostrum extending to base of metathoracic coxae. Prothoracic femora .355 mm. in length, provided with comparatively few hairs which are no longer than those on the vertex of the head. Prothoracic tibiae .375 mm. in length. Hair on outer margin of prothoracic tibiae about .015 mm. in length, rather thick and bluntly pointed, hairs on inner margin extremely sparse, shorter than those on the outer margin and sharp pointed, remaining hairs longer and sharp pointed. Mesothoracic femora with few hairs, hairs on dorsal margin shorter than those on ventral margin, and dull at the apex, remaining hairs on this segment sharp pointed, all hairs on this segment slightly longer near the apex than elsewhere.

Metathoracic femora .63 mm. in length, provided with comparatively few hairs, all of which are more or less subequal in length to those on the vertex of the head, and all of which are sharp pointed. The hairs on the dorsal margin are shorter than the space between them. Metathoracic tibiae .795 mm. in length. Hairs on hind tibiae varying in length from .015-.04 mm. with the shortest hairs near the base. All hairs shorter than the width of segment, and none inclined more than forty-five degrees. Hairs on outer margin distinctly spine like and blunt at the apex. Hairs on inner margin finer than those on outer margin and set at an angle of about sixty degrees, and sharp pointed. These hairs are fewer than those on the outer margin. Metathoracic tarsal segments .10 and .16 mm. in length. The dorsal surface of the first tarsal segment has one pair of hairs. The ventral surface of the second tarsal segment has very few hairs, all of which are shorter than the width of segment, the longest being near the apex, the dorsal surface of this segment also has very few hairs, these are also very short. Tarsal claws bifurcate, but the divisions not equal, shaped like a mitten. Cape apparently absent. Cornicles same color as abdomen.

Alate viviparous female.

Length from vertex to end of anal plate 1.82 mm. Patch Bulletin No.

202 Maine Agricultural Experiment Station p. 169 describes the color as follows: "Head light greenish brown with I and II of the antennae concolorous. III, IV and V were each pale at proximal and dark at distal part. Eyes very red. Thorax green with lobes brown, and ventral plate dark brown. Abdomen light but vivid green and thickly speckled with fine dark dots." Antennal segments with the following lengths: III .18 mm., IV .09 mm., V .09 + .04 mm. Third antennal segment with sensoria varying from 3-4. All sensoria on this segment small, and only slightly tuberculate. Fourth antennal segment antennal with primary sensorium small and quite round. All hair on antennae short and fine. Hair on vertex of head varying from .015-.03 mm. in length, and only slightly dull at the end. Prothoracic femora .36 mm. long prothoracic tibiae .48 mm. in length. Hairs on outer margin of prothoracic tibiae in middle region about as long as width of tibiae, hairs near base, shorter than width of tibiae, hairs on this surface distinctly dull at the apex and rather coarse in texture. Hairs on inner margin of prothoracic tibiae fine, sharp pointed, and about half as long as those on the outer margin, not as numerous. Prothoracic femora with few hairs, the hairs are fine, fine, sharp pointed, and about half as long as those on the outer margin margin very sparse and short. Metathoracic femora .675 mm. long. Hairs on this segment very sparse, fine, sharp pointed, those on dorsal margin varying from .02-.03 mm. in length, they are spaced rather apart than their length. Metathoracic tibiae .975 mm. in length. Hairs on outer margin of metathoracic tibiae sparse, varying from .015 mm. at the base to just under .05 mm. towards the apex, these hairs are very much inclined near the base, a condition which may not be normal, beyond the middle the hairs are inclined at an angle of about forty-five degrees, these hairs are sharp pointed. The hairs on the inner margin of the metathoracic tibiae are shorter than those on the outer margin, more uniform in length, and fewer in number. The first tarsal segment has one pair of hairs on the dorsal surface, this segment is .11 mm. in length. The second metatarsal segment is .18 mm. in length, the hairs on the ventral surface are fine and short, being no longer than those on the ventral surface of the first segment, the hairs on the dorsal surface are longer than those on the ventral surface, but still shorter than the width of segment. Media of fore wings simple, stigma not distinctly separated, cell formed by radial sector, similar to that of *E. essigi*. Median posterior tubercle on cauda apparently absent, but this condition may be due to position in which the specimen is mounted.

This species may be differentiated from *E. californica* (Essig) by the media not being forked, by fewer shorter hairs on the femora, by the shorter hairs on metathoracic tibiae, and by the hairs on the prothoracic tibiae being blunt on the outer margin. From *E. pini* Wilson which also has the media simple, this species may be differentiated by the absence of the well developed median posterior tubercle on the cauda, by the longer hairs on the outer margin of the metathoracic tibiae.

Holotype, alate viviparous female, referred to by Patch as *E. californica* (Essig) Stillwater, Maine, July 4, 1909, on *Pinus Strobus*. Morphotype, apterous viviparous female Acc. No. 37-09, Orono, Main, June 27, 1909, on *Pinus strobus*, taken this side of Gilman Falls, Ben-

noek Road, Coll. Henry Millet. Notes by Patch associated with this slide are as follows: "*Lachnus agilis?*" this crossed out and "*Essigella californica* Essig?" added. Holotype in United States National Museum Morphotype returned to the Entomological collection of the University of Maine. One apterous viviparous female taken on *Pinus strobus*, Stillwater, Maine, July 4, 1909 is a paratype.

Essigella pergandei n. sp.

Plate I

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.05-1.42 mm. Color notes from life not available. Mounted specimens suggest the color was either yellow or pale green, with the head and thorax slightly darker than the abdomen. Cape either extremely pale or absent. Antennae concolorous with head, with the apex of fourth and fifth segments slightly dusky. Femora concolorous with body, tibiae slightly dusky, as are the tarsal segments. Length of antennal segments as follows: III .12-.13 mm., IV .06-.07 mm., V .07 + .04 mm. Fifth segment with primary sensorium slightly tuberculate. Antennae with minute hairs. Vertex of head with a few short blunt hairs, hairs on dorsum of head slightly longer, finer and more sharply pointed. Rostrum reaching to end of metathoracic coxae.

Lengths of pro meso and metathoracic femora as follows: .33 mm., .27 mm., .42 - .48 mm. Hairs on dorsal margin of metathoracic femora about .015 mm. in length, rather coarse, sharp pointed, other hairs on this segment quite similar. Lengths of pro meso and metathoracic tibiae as follows: .36 - .40 mm., .40 - .45 mm., .615 - .80 mm. Hairs on prothoracic tibiae varying from .015 - .02 mm. in length with the hairs on the outer margin slightly longer and coarser than the hairs on the inner margin, and not quite so sharp pointed. Hairs on mesothoracic tibiae similar to those on prothoracic tibiae, but not quite so long. Hairs on outer margin of metathoracic tibiae varying from .02 - .03 mm. in length. The hairs on the inner margin of the hind tibiae are slightly longer than the hairs on the outer margin, somewhat finer, and sharper pointed. First metatarsal segment varying from .075 - .09 mm. in length, the dorsum with one pair of hairs. Second metatarsal segment varying from .135-.16 mm. in length, the hairs on the dorsum of this segment are not much longer than the hairs on ventral surface and only slightly coarser. All tarsal claws bifurcate. Dorsum of abdomen with a few short coarse hairs, which do not arise from pigmented spots. Cauda with few hairs, the median posterior tubercle is well developed.

Holotype, apterous viviparous female, deposited in the United States National Museum. Host, *Abies concolor*, Seattle, Washington, July 17, 1955, M. J. Forsell collector. Holotype slide and paratype slide with several specimens.

This species is allied to *Essigella wilsoni* from which it differs in having the tarsal claws bifurcate, sharp pointed hairs on the tibiae, longer hairs on the tibiae, and the better developed median posterior tubercle on the cauda.

***Essigella pineti* n. sp.**

Plate I

Alate viviparous female.

Length from vertex to end of anal plate 2.275 mm. Color in life not recorded. Cleared with head and thorax dark dusky brown, abdomen clear, possibly light green in life, with five transverse rows of small pigmented spots, each of which is provided with a hair which is about as long as the width of the spot, or but little longer. Cauda and anal plate dusky, both slightly setulose. Cornicles not differentiated from abdomen by color. Antennae dusky brown, except for the base of third segment which is pale. Femora light dusky brown, with dorsal margin slightly darker. Tibiae dark dusky with apical portions darker.

Anterior margin of head with a few long rather coarse hairs, which are slightly capitate at the ends, these hairs are about .06 mm. in length. Dorsum of head with very few hairs, the hairs on the posterior dorsum being much shorter than the hairs on the vertex, all hairs on dorsum of head sharp pointed, and finer than hairs on vertex. Antennal segments with the following lengths: III .24 mm., IV .12 mm., V .08 + .04 mm. Third antennal segment with from two to four sensoria, fourth and fifth segments with only primary sensoria. All antennal segments very coarsely imbricated. Pro, meso, and metathoracic femora with the following lengths: .06, .39, 1.00 mm. Pro, meso, and metathoracic tibiae with the following lengths: .73, .73, 1.50 mm. First and second metatarsal segments with the following lengths: .13 and .23 mm. Prothoracic femora with the dorsal margins with a moderate number of hairs which vary from .03 - .045. These hairs are dull at the apex. Hairs on ventral surface of prothoracic femora very sparse, sharp pointed and about .03 mm. in length. Hairs on mesothoracic femora few, fine, sharp pointed and about .01 mm. in length or even less. Hairs on dorsal margin of metathoracic femora few, hardly .04 mm. in length, dull at the end. Hairs on ventral margin of metathoracic femora shorter than those on dorsal margin, spaced farther apart than their length. Hairs on prothoracic tibiae differing on outer and inner margins, those on outer margin coarse, and dull at the end, the longest in the mid region about .06 mm. in length, the shortest near the base, are hardly .015 mm. in length. The hairs on the inner margin of the prothoracic tibiae are fine sharp pointed and about .03 mm. long. Hairs on mesothoracic tibiae much shorter than width of tibiae. Hairs on metathoracic tibiae varying from .04 - .06 mm. in length on the outer margin, with the hairs near the base somewhat shorter. All hairs on the outer margin of the metathoracic tibiae capitate at the end, and distinctly dull. Hairs on inner margin of metathoracic tibiae fine, shorter than those on the outer margin and sharp pointed. Media once-branched. Stigma ending in a distinct point.

The pigmented spots on the dorsum are small, they are arranged in transverse rows, and each is provided with a short hair, each row is one spot wide. Directly beneath the spots on the dorsum, there are transverse bands of long fine hairs on the venter. Cornicles mere rings. Portion of abdomen dorsal to genital plate with row of coarse bluntly pointed hairs. Genital plate with a few widely spaced hairs. Median tubercle on posterior portion of cauda not well developed.

The abdomen of this species suggests the abdomen of *E. essigi* but the genital plates differ, as do the stigma, the lengths of the prothoracic femora and tibiae, and the length of the tibial hairs.

Holotype, alate viviparous female, returned to the Essig collection. Host, *Pinus ponderosa*, Yosemite, California, May 17, 1938. E. O. Essig, collector. The apterous female mounted on the type slide may or may not belong to this species, and because of this question it is not described.

This species is known only from the holotype.

Essigella pini Wilson

Plate III

Essigella pini Wilson, H. F. Three New Lachnids with Comparative Notes on three others (Homop.). Ent. News Vol. XXX No. I pp. 2 - 3 1919. Original description.

Essigella pini Wilson, Gillette and Palmer 1931: 841, (misidentification).

Essigella pini Wilson, Palmer 1952 p. 16, (misidentification).

Alate viviparous female.

Length from vertex to end of anal plate 1.80 mm. Specimen not cleared, as mounted, head and thorax light dusky. Abdomen yellowish, with small dusky spots on the dorsum, these are arranged in rows, each side of the abdomen has a row of slightly larger and darker spots than those on the dorsum. Femora slightly dusky, tibiae uniform in color, lighter than femora, tarsal segments concolorous with ends of tibiae. Length of antennal segments as follows: III .18 mm., IV .08 mm., V .08 + .025 mm. Third antennal segment with three sensoria, fourth and fifth antennal segments with only primary sensoria. Vertex of head with few comparatively fine dull pointed hairs, other hairs on the head quite similar. Media simple. Prothoracic femora .345 mm. in length, length of metathoracic femora .525 mm. Hairs on dorsal margin of metathoracic femora very short, stubby and dull at the end, hairs on other regions of this segment much longer, finer, and sharp pointed. Metathoracic tibiae .825 mm. in length, hair on this segment of two types, those on outer margin of variable length, usually short to very short, thick, and dull at the apex, hairs of this type are arranged in about three rows, they often have to be looked for, one row is often much shorter than the other two. Remaining hairs on the metathoracic tibiae much longer, finer and very droopy, some almost procumbent. Metathoracic tarsal segments with the following lengths: first .09 mm. second .17 mm. The first tarsal segment has one pair of hairs on the dorsum. Cornicles slightly elevated rings, slightly darker in color than the abdomen. Median posterior tubercle on cauda extra well developed, larger than that of any such tubercle of known species, distinctly nipple like.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.28 - 1.60 mm. Specimens mounted without clearing are a uniform pale yellow, in life most likely pale green. Cape apparently absent. Antennal segments with the following lengths: III .12 mm., IV .07 mm., V .07 + .03 mm. There are no secondary sensoria. Anterior margin of head with a few hairs of variable length, but none long, the distal end of which is dif-

ficult to classify being neither distinctly dull or sharp. Rostrum when extended reaching to coxae of metathoracic legs. Prothoracic femora .30 mm. in length, length of mesothoracic femora .255 mm., length of metathoracic femora .45 mm. Dorsal margin of metathoracic femora provided with a few extra short, dull pointed hairs which are spaced further apart than their length, other hair on this segment very sparse, fine, and slightly longer as well as sharp pointed. Metathoracic tibiae varying in length from .40 - .55 mm., with hairs on outer margin similar to those of alate viviparous female, so short that they have to be looked for, remaining hairs on this segment sharp pointed, for the most parte equal to width of segment, but often shorter, never longer. Cornicles as in alate female. Median posterior tubercle similar to that of alate viviparous female. Cauda and anal plate with numerous fine sharp pointed, rather long hairs. Hairs on dorsum of abdomen extremely sparse, fine and not much if any longer than the slightly elevated area from which they arise.

Essigella essigi may be easily differentiated from *pini* Wilson by the much shorter, less droopy hairs on the tibiae, the alates have more spots on the dorsum of the abdomen, the aptera have a well developed cape, and the blunt hairs are more numerous.

All references to this species known to me except those of Tissot refer to other species.

Lectotype alate viviparous female in collection of A. A. Granovsky. Morphotype apterous viviparous female also in Granovsky collection Both types from original material described by Wilson and formerly in his collection. Three slides from the aphid collection of the University of Maine have been seen. They are part of the original material and carry the same accession number 82 - 41 over 11. Two of the slides carry the date June 28, 1914, one May 24, 1914, a date not mentioned in the original description. The Maine slides were not determined.

Other slides of this species which have been seen were taken and determined by A. N. Tissot on *Pinus taeda*, Gainesville, Florida, March 3, 1928. On *Pinus taeda*, St. Augustine, Florida, May 5, 1945. Two slides in the United States National Museum are of interest, both contain apterous viviparous females. One slide, with the number 121649 carries the following note, "N. Gen. of Lachnids, on Pine", but no other information. One slide with the number 183t (1.3.66) has the following data. "On Pine, Eufoula, Ala. March 10, 76." This is the first record of specimens of the genus *Essigella* known to me. Both slides appear to have been labeled by Pergande.

***Essigella robusta* n. sp.**

Plate IV

Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.10 - 2.32 mm. Color recorded by Essig as green. Cleared specimens indicate the color of the cape as pale buff. Legs pale dusky with the tibiae slightly darker near the apex. Antennal segments one, two and the basal three fourths of the third pale, a remainder of third segment and all of fourth and fifth segments pale dusky.

Vertex of head with a few thick blunt hairs which vary in length from

.015 - .05 mm. The shorter of these hairs do not taper to the end, but are of uniform thickness throughout, the longer hairs taper a little towards the apex. Remaining hairs on head slightly longer than those on vertex, thinner, and sharp pointed. Antennal segments with the following lengths: III .18 - .195 mm., IV .09 mm., V., .109 + .03 mm. Third antennal segment without sensoria. Primary sensoria on fourth and fifth antennal segments small, not tuberculate. Antennal hairs very sparse, fine, and short, difficult to differentiate except on first and second segments where they are better developed. Rostrum when extended reaching to end of metathoracic coxae. Prothoracic femora varying from .48 - .525 mm. in length. Prothoracic tibiae varying from .525 - .65 mm. always longer than prothoracic femora. Mesothoracic femora varying from .405 - .45 mm. in length. Metathoracic femora varying from .705 - .75 mm. Metathoracic tibiae varying in length from 1.05 - 1.08 mm. Prothoracic femora with numerous hairs on dorsal margin, these hairs are almost straight, rather thick and blunt at the end, they vary in length from .015 - .03 mm. There is an irregular row of similar hairs near them on one side of the femora, but the remaining hairs on the prothoracic femora are fine and sharp pointed. The hairs on the prothoracic tibiae are numerous, those on the outer margin are thick, blunt at the end and about .03 mm. or slightly less in length. The remaining hairs on the prothoracic tibiae are the same length as those on the outer margin, but they are somewhat finer, and sharp pointed. The hairs on the mesothoracic tibiae are shorter and fewer than the hairs on the tibiae of the prothoracic pair of legs, on this segment there are also two types of hairs. The hairs on the dorsal margin of the metathoracic femora are about .03 mm. in length, these hairs are straight, and blunt at the end. The hairs on the outer margin of the metathoracic tibiae vary in length from about one third the width of the tibiae, to subequal to width, to just equal to width. These hairs are coarse, thick, and dull at the end, they vary in length from .015-.45 mm. First tarsal segment of metathoracic legs varying from .12 - .14 mm. This segment, like the first tarsal segment of the prothoracic and mesothoracic pairs of legs has two pairs of rather coarse hairs, of which the more basal pair is shortest, the dorsal hairs are blunt at the end. The second metatarsal segment varies from .17 - .23 mm. in length, it has few hairs, as a rule the hairs on the dorsal surface are coarser and slightly longer than the hairs on the ventral surface, the apical dorsal hairs being longest.

Dorsum of abdomen with a few transverse rows of short coarse hairs, the hairs just anterior to the cauda being longer and coarser than the hairs more anterior. The genital plate has the long fine sharp pointed hairs uniformly distributed over its surface, the lateral margins of this structure are irregular, at times even toothed.

This species is much larger than *E. essigi* and lacks the dusky cape of *essigi* and also has two pairs of hairs on the dorsum of the first tarsal segment. From *E. braggi* it differs in shorter hairs, by having two pairs of hairs on the dorsum of all first tarsal segments, and finer, shorter, not bristle like hairs on the antennae. The two species have much the same body shape.

Holotype, apterous viviparous female, returned to the Essig collection.

Host, *Pinus contorta* (lodgepole pine), alt. 7500 ft. upper Echo Lake, California. Aug. 6, 1937, E. O. Essig, collector.

This species is known from only one collection. Twelve slides have been made paratype.

Essigella swaini n. sp.

Plate II

Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.02 - 2.10 mm. Color in life not recorded. Mounted specimens which have been cleared are very pale throughout, with some specimens showing a very pale buff colored cape. Apical portion of third antennal segment and remaining antennal segments slightly dusky. All legs light dusky, uniform in color.

Antennal segments with the following lengths: III .17 - .19 mm., IV .09 - .10 mm., V .075 - .08 + .03 mm. Hair on antennae extremely sparse, almost totally lacking, the few hairs present not longer than the space between imbrications and very fine. First and second antennal segments likewise almost free from hair. Third segment of antennae without sensoria, primary sensoria on fourth and fifth antennal segments small, not tuberculate. Rostrum when fully extended with last two segments extending beyond metathoracic coxae. Vertex of head with a few short stubby hairs, remaining hairs on head short, fine, and sharp pointed.

Dorsum of thorax and abdomen with a very pale buff colored cape. Hair on dorsum of abdomen extremely sparse and so short that it can only be seen on specimens mounted on their side. Cornicles mere rings, slightly elevated from the abdomen. Cauda with median posterior tubercle. Prothoracic femora varying from .36 - .43 mm., mesothoracic femora varying from .30 - .31 mm., length of metathoracic femora varying from .54 - .72 mm. each extreme represented by a single specimen. Most common length of metathoracic femora is .62 mm. All femora with few hairs, which are short and fine. The hairs on the dorsal margin of the metathoracic femora are blunt at the end, slightly curved, and for the most part farther apart than their length. All tibiae with few, extremely short fine hairs, of which those on the outer margin are short and blunt at the end, in contrast with the remaining hairs which are slightly longer and sharp pointed. In cases the tibial hairs are so short and sparse that they have to be looked for. The metathoracic tibiae vary in length from .82 - .91 mm. The first tarsal segment of the metathoracic legs is .09 mm. in length, this segment has two long curved hairs on its dorsal surface. The second segment of the metathoracic tarsus varies from .17 - .19 mm. this segment has few hairs, they are short, and about the same length on the dorsal and ventral surfaces.

Alate viviparous female.

Length from vertex to end of cauda varying from 1.20 - 1.38 mm. Color as indicated by uncleared specimens most likely dusky green. Antennae and legs pale dusky, quite uniform throughout.

Length of antennal segments as follows: III .20 - .21 mm., IV .11 mm., V .08 - .09 + .04 mm. Third, fourth and fifth antennal segments with one sensorium each. All antennal segments well imbricated. Third and fourth

antennal segments without hairs, hairs on fifth limited to the apex of the unguis. Primary sensorium on fifth antennal segment not tuberculate, located on the unguis small, and apt to be overlooked. The marginal sensoria on this segment are bunched at the junction of the unguis and base of the fifth segment, they are apt to be taken for the primary sensorium. First and second antennal segments with hardly any hair. Vertex of head with a few short blunt hairs. Rostrum extending beyond metathoracic coxae by about the last segment. Media once forked, wings rather pale. Prothoracic femora varying from .43 - .47 mm., metathoracic femora varying from .67 - .73 mm. Prothoracic tibiae varying from .46 - .48 mm. always slightly longer than femora. Metathoracic tibiae varying from 1.09 - 1.20 mm. Dorsal margins of all femora with short, fine, slightly dull hairs, which are weakly curved and spaced as a rule so that there is no overlapping. The tibial hairs are longer than the hairs on this segment of the apterous female, but may be classed as short. Hairs on prothoracic tibiae numerous, more numerous on outer margin than on inner. On the outer margin they vary in length from .04 - .05 mm. they are slightly longer than the width of segment, and blunt at the apex, remaining hairs on this segment, sharp pointed. Metathoracic femora very slender. Hairs on outer margin of metathoracic tibiae shorter than width of segment and dull at the end, these hairs are slightly curved, and so spaced that they just barely overlap. The hairs near the base of the tibiae are much shorter than those near the middle, while the hairs near the apex are slightly longer and much more inclined, being almost procumbent. The hairs on the inner surface of the metathoracic tibiae are short, at least some are upstanding, they are at times widely spaced. The dorsal surface of the first tarsal segment has two pairs of hairs. The hairs on the ventral surface of the second metatarsal segment are but a little shorter than those on the dorsum. The hairs at the apex of this segment on the dorsal surface are much longer than other hairs on this surface. The specimens are not sufficiently cleared to show the cornicles, or to differentiate the cauda and anal plate.

Holotype, apterous viviparous female, taken on *Pinus sabiniana*, Kelseyville, California, April 12, 1936, collected by P. Schulthesis. Morphotype, alate viviparous female on *Pinus sabiniana* (Digger Pine), Kelseyville, California, July 15, 1935, E. Daybell collector. Both slides are in the Essig collection. Two slides of this species taken on Pine, Pinnacles National Monument, San Benito, California, April 24, 1948, collected by J. W. MacSwain have been seen. Another slide taken on *Pinus sabiniana*, May 20, 1916 at Red Bluff, California by C. B. Weeks is in the Essig collection.

This species is allied to *E. essig* from which it may be differentiated at once by the lack of a deeply pigmented cape in the apterous forms, by shorter and fewer tibial hairs, and by longer femora and tibiae, and by the fact that the media is once forked.

***Essigella wilsoni* n. sp.**

Plate II

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.42 - 1.80 mm. Color notes taken from living specimens not available. Cleared speci-

mens indicate that the color was more or less uniform, probably very pale yellow, or green, with the dorsum covered by a very pale dusky cape only slightly darker than the rest of the body. Fourth and fifth antennal segments slightly darker than remaining segments. Femora slightly darker than body, tibiae and tarsal segments darker than femora, but at most pale dusky. Cauda and anal plate dusky. Cornicles with rim slightly darker than surrounding area. Abdomen in adults free from pigmented spots, but immature specimens with light pigmented dorsal spots from which a hair arises.

Antennal segments with the following lengths: III .12 - .15 mm., IV .067 - .08 mm., V .075 - .08 + .03 mm. Hair on antennae minute. There are no secondary sensoria. All antennal segments imbricated. Anterior vertex of head with a few short blunt pointed hairs, elsewhere on the head the hairs are longer and sharp pointed. Rostrum reaching to end of metathoracic coxae. Metathoracic femora varying from .45 - .57 mm. in length, provided with short rather coarse sharp pointed hairs, on the dorsal margin these hairs are slightly farther apart than the hairs are long. Hind tibiae varying from .60 - .85 mm. in length, provided with comparatively few hairs which differ in character on the inner and outer margins. The hairs on the outer margin being short, measuring about .02 mm. in length near the middle of the tibiae, and with a blunt end. Near the apex of the tibiae, on this surface the hairs are slightly longer than they are near the middle and sharp pointed. The hairs on the inner margin of the hind tibiae are longer than those on the outer margin, and all are sharp pointed at the end. The longest hairs on this surface however, are considerably shorter than the widths of the tibiae. First segment of the hind tarsus varying from .075 - .10 mm. in length, this segment has one pair of hairs on the dorsal surface, the hairs on the ventral surface of this segment are few and confined largely to the apical half of the segment. The claws of this species are not distinctly bifurcate in all cases, and in some specimens distinctly not so. In the latter case the condition may be due to one terminal claw not developing. Dorsum of abdomen with very few extremely short blunt hairs. Cornicles with rims slightly elevated on very low cone-shaped areas. Cauda with median posterior tubercle.

This species is closely allied to *E. pergandei* from which it differs in not having the claws distinctly bifurcate, in having the hairs on the outer margin of the tibiae blunter at the end, coarser hairs on the dorsal margin of the metathoracic femora, and the median posterior tubercle on the cauda not so well developed.

Holotype, apterous viviparous female, taken on *Pseudotsuga menziesii* (Douglas fr), Whitby Island, Seattle, Washington, Aug. 29, 1955 by M. J. Forsell. The holotype is in the collection of E. O. Essig. One paratype slide with several specimens with the same data as the holotype has been seen. Mr. Forsell sent part of the original material to F. C. Hottes, none of which is in good condition.

Prof. H. F. Wilson for whom this species is named, in a paper which he published in 1919, mentions a species of *Essigella* which he calls *californica* (Essig) as having been collected on *Pseudotsuga douglassii* at Corvallis, Oregon. His figure of the hind leg of this species, particularly the hairs on the tibiae, strongly suggest that he was dealing with

specimens of the species *wilsoni*. Of this I have no proof, however this figure is not in agreement with the hairs of *E. californica* (Essig). It should be noted that Wilson's figure is that of an alate viviparous female, in the text he mentions the hairs on the legs as being long, prominent and spine-like in the apterous form, again hardly characteristic of *E. californica* (Essig). Again I have no proof, but I suspect that Wilson described the species here called *E. gillettei*, while his figure at least in part was drawn from *wilsoni*. It should be noted that part of Wilson's material which he determined as *californica* had *Pinus ponderosa* as host.

Wilson, H. F.

- 1919 Three New Lachnids With Comparative Notes on Three Others (Homop.). Entomological News Vol. XXX pp. 1-2 figs. 1-6.

Key to Species of Essigella

1. Tarsal claws with ends not distinctly bifurcated..... 2
Tarsal claws with ends bifurcated..... 3
2. Hairs on outer margin of hind tibiae .06 - .08 mm.; metathoracic femora .805 mm.; metathoracic tibiae 1.2 mm..... *monelli* n. sp.
Hairs on outer margin of metathoracic tibiae .04 - .07 mm.; metathoracic femora .70 mm.; metathoracic tibiae 1.08 mm.....
..... *cocheta* n. sp.
Hairs on outer margin of metathoracic tibiae .015 - .02 mm.; metathoracic femora .45 - .57 mm.; metathoracic tibiae .60 - .85 mm.
..... *wilsoni* n. sp.
3. Hairs on first, second and third antennal segments coarse, distinctly bristle-like..... *braggi* n. sp.
Hairs on first, second and third antennal segments not coarse, not distinctly bristle-like..... 4
4. First metatarsal segment .12 mm. or more..... 5
First metatarsal segment less than .12 mm..... 11
5. Cape of apterous forms extremely dark, blackish-brown.....
..... *fusca* Gillette and Palmer
Cape of apterous forms present or absent, not blackish-brown..... 6
6. Hairs on dorsal margin of metathoracic femora .06 - .08 mm.; hairs on outer margin of metathoracic tibiae .09 - .12 mm..... 7
Hairs on dorsal margin of metathoracic femora .05 mm. or shorter; hairs on outer margin of metathoracic tibiae not longer than .08 mm. 8
7. First metatarsal segment .16 - .19 mm.; third antennal segment of alate viviparous female .21 mm.; fourth antennal segment .10 mm.; tibiae very dark; tibial hairs coarse on outer margin .10 - .12 mm. black; hairs on dorsal margin of metathoracic femora .075 - .09 mm.
..... *palmerae* n. sp.
First metatarsal segment .11 - .15 mm.; third antennal segment of alate viviparous female .25 mm.; fourth antennal segment .15 mm.; tibiae dusky but not dark; hairs on tibiae not coarse on outer margin, not dark; hairs on dorsal margin of metathoracic femora .06 - .07 mm. *gillettei* n. sp.
8. Hairs on mid region of outer margin of metathoracic tibiae .02 - .03 mm. 9

- Hairs on mid region of outer margin of metathoracic tibiae .04 - .08 mm. 10
9. Metathoracic femora .75 mm.; hairs on vertex blunt, distinctly spine-like, .03 - .04 mm. in length; second metatarsal segment .17 - .23 mm. long; cape pale; hairs on dorsal margin of metathoracic femora numerous; a robust species.....*robusta* n. sp.
Metathoracic femora .65 mm.; hairs on vertex coarse, blunt, not over .03 mm. in length; second metatarsal segment .15 - .18 mm.; cape distinct; hairs on metathoracic femora few; a medium sized species.....*knowltoni* n. sp.
10. Metathoracic femora of alate viviparous female 1.00 mm. in length; hairs on outer margin of metathoracic tibiae .04 - .06 mm. distinctly dull at end.....*pineti* n. sp.
Metathoracic femora of apterous viviparous female .84 - .95 mm.; hairs on outer margin of metathoracic tibiae .03 - .07 mm. not distinctly blunt at end; cape pale.....*agilis* n. sp.
11. Greatest length of hairs on mid region of outer margin of metathoracic tibiae .03 mm. as a rule much less..... 14
Greatest length of hairs on mid region of outer margin of metathoracic tibiae more than .03 mm. 12
12. Hairs on outer margin of metathoracic tibiae .03 - .07 mm. metathoracic femora of aptera .63 mm. of alate .72 - .78 mm. media once branched; cape absent.....*californica* (Essig)
Hairs on outer margin of metathoracic tibiae not longer than .06 mm. as a rule much less; media simple..... 13
13. Hairs on vertex of head not less than .03 mm.; hairs on outer margin of metathoracic tibiae sharp-pointed.....*maculata* n. sp.
Hairs on vertex of head less than .03 mm.; hairs on outer margin of metathoracic tibiae blunt at end.....*patchae* n. sp.
14. Apterous females with distinct cape.....*essigi* n. sp.
Apterous females with cape absent or indistinct..... 15
15. Median tubercle at apex of cauda especially well developed, distinctly wart or nipple-like.....*pini* Wilson
Median tubercle at apex of cauda not especially well developed, not wart or nipple-like..... 16
16. Hairs on outer margin of metathoracic tibiae of apterous viviparous females .02 - .03 mm. 17
Hairs on outer margin of metathoracic tibiae hardly over .01 mm. 18
17. Size small not over 1.42 mm. third antennal segment .13 mm. at most; greatest length of metathoracic tibiae 04. mm.
.....*pergandei* n. sp.
Size large, 1.80 mm. up to 2.12 mm. in length, third antennal segment .18 mm. long, length of metathoracic tibiae .77 - .90 mm.
.....*claremontiana* n. sp.
18. Antennal segment three of apterous viviparous female .10 - .15 mm.; prothoracic femora and tibiae about equal in length.....*hoerneri* Gillette and Palmer
Antennal segment three of apterous viviparous female .19 mm.; prothoracic tibiae longer than femora.....*swaini* n. sp.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW NEOTROPICAL WATER-STRIDERS
(HEMIPTERA)

BY CARL J. DRAKE

Smithsonian Institution, Washington, D. C.

The present paper contains the descriptions of a new genus and two new species of Gerridae and a new genus and four new species of Veliidae. The types are in the Drake Collection, U. S. N. M.

Family GERRIDAE Leach 1815

Tachygonus, new gen.

Limnometra Champion, 1898, Biol. Centr.-Amer. Rhynch. 2:150-151.

(Desc. and figs. two new spp. from Centr. Am.).

Tenagogonus Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash. 10:209.

(Cat. of Am. spp.).

Tenagogonus Drake and Harris, 1934, Ann. Carn. Mus. 23:131-134.

(Desc. gen., spp., figs. and gives key to spp.).

Tenagogonus Kuitert, 1942, Bull. Univ. Kan. Univ. 28:131-134. (Desc.,

figs. and gives key to Am. spp.; two new spp. desc.)

The name *Tachygonus* is here proposed for the reception of the American species hitherto wrongly assigned to the genus *Tenagogonus* Stal (1853, 1855). The generic characters of *Limnometra* Champion (1898) (not Mayr) and by the authors Drake and Harris (1934) and by Kuitert (1942) (not *Tenagogonus* Stal, 1855) belong to the new genus *Tachygonus*. *Tenagogonus adamsoni* Drake is here designated as the genotype of *Tachygonus*.

The water-striders catalogued by Kirkaldy and Bueno (1909) also belong to *Tachygonus*. The species included by Hungerford (1919) in the genus *Tenagogonus* belong to the genus *Limnogonus* Stal. *Tenagogonus spinulosa* Poisson (1954, Beitr. F. Perus Bd. 4, p. 68, figs.) also belongs to *Limnogonus* and is a synonym of a Neotropical member of this genus. In addition to the type species, *Tachygonus* comprises *T. celocis* (Drake and Harris), *T. opacus* (Champion), *T. quadrilineatus* (Champion) and *T. dulineatus* (Kuitert). (New combinations). *T. duolineatus* (Kuitert) is a synonym of *T. adamsoni* (Drake). (New synonymy).

Ovatametra bella, new sp.

Apterous male: Head ochraceous with median stripe reaching from middle of vertex anteriorly between anterior pair of long sensory hairs, labrum and anterior part of front fuscous-black; three pairs of long, erect, sensory hairs (trichobothria?) placed as follows: First pair placed near base of head, second pair on vertex near middle of eyes and third pair just in front of eyes, the pairs widely separated from one another

and individuals of a pair by the width of vertex, each hair on a feebly raised, dark fuscous spot. Labium testaceous with posterior half blackish. Antenna shortly pubescent, testaceous or ochraceous with apical fourth of segment II, distal half of III and entire IV blackish, measurement—I, 0.50; II, 0.30; IV, 0.48. Entire body slightly shiny, with some bluish spots above, lateral sides and beneath quite bluish. Inferior surface whitish testaceous with narrow basal part of mesosternum, metasternum and abdomen blackish fuscous. Length, 2.70 mm.; width, 1.25 mm.

Pronotum short, depressed on disc, brownish ochraceous, with small, median basal spot and the broad, inverted U-shaped mark fuscous-black, the arms of the latter not quite reaching to base of pronotum. Mesonotum large, depressed on median line, brownish ochraceous, with a small, transverse, median spot in front, a triangular basal spot at middle and lateral stripes (one on each side) widely interrupted (not existing from behind middle to apical fourth) fuscous-black. Metanotum subquadrate, black. Mesopleuron with a black stripe along inferior edge and a median longitudinal stripe. Abdominal tergites above with posterior part of segments III to VII (inclusive) testaceous, II with a median testaceous spot. Connexivum very little narrowed apically, with last segment subquadrate, testaceous with exterior margin blackish. Male genital segments testaceous, beneath widely depressed on apical third; parameres fairly long, curved inward, narrowed apically. Last segment of ventor about as long as two preceding segments, roundly emarginate behind.

Anterior leg testaceous with a longitudinal black stripe on outer face of femur, tarsus dark fuscous; femur 0.94 mm. long; tibia 0.75 mm. long, distinctly bowed inward, with a large, slightly raised ovate spot of short dense hair in middle of convex inner face, between there and apex with a fringe (3 or 4 hairs deep) of numerous longer brown hairs. Intermediate and hind legs dusky testaceous with tibiae and tarsi infusate. Middle femur 1.50 mm. long, tibia 2.40 mm. long and tarsus 1.75 mm. long. Hind femur 1.50 mm. long, tibia 0.82 mm. long and tarsus 0.56 mm. long.

Female: More robust than male with lateral stripe on each side of mesonotum solid and not interrupted; metanotum with a large ochraceous spot on each side of median line. Antennal measurements—I, 0.58 mm.; II, 0.34 mm.; III, 0.42 mm.; IV, 0.52 mm. Anterior femur with a prominent black stripe on outer face; tibia slightly bowed apically, without hairy ovate patch as in male but with fringe of brown hairs (3 or 4 hairs wide) on apical third beneath. Middle femur 1.50 mm. long, the tibia 2.30 mm. long and tarsus 1.75 mm. long. Hind femur 1.60 mm. long, the tibia 1.00 mm. long and tarsus 0.68 mm.

Type (Male) and *Allotype* (female), both apterous, Quarto Ojos, Bolivia, April 27, 1957, collected in a small stream.

The lateral, longitudinal, black stripe on outer face of anterior femur separates this species at once from the new species described below. The black markings of dorsal surface and lateral sides and the modified anterior tibia (especially the hairy ovate patch in male) distinguish *O. bella*, new sp. from the members heretofore characterized in the genus.

***Ovatametra amnica*, new sp.**

Apterous female: Head above ochraceous with lateral stripe on each side coalescing anteriorly with black apical part of frons, wide median

stripe of black extending anteriorly almost to darkened part of frons; beneath whitish testaceous. Antennae dusky brownish testaceous with basal half of segment II testaceous, clothed with short pubescence, measurements—I, 62; II 0.42; III, 39; IV, 0.60. Labium testaceous with distal two segments blackish. Length, 2.80 mm.; width, 1.30 mm. long. Male unknown.

Dorsal surface brownish ochraceous, with prominent markings, somewhat bluish, much more bluish beneath. Pronotum short, depressed, with lateral sides and hind margin jointly rounded, with a black spot behind each eye; narrow median stripe and exterior outer edge (lateral sides and behind) edged with black. Mesonotum slightly paler on median line, with the large, median, subbasal, black spot longly attenuated from apex anteriorly, broad lateral black-fuscous stripe on each side solid and not extending to base of segment, front margin margined with black-fuscous. Metanotum black, large, subquadrate. Mesopleuron with inferior and median longitudinal stripes black-fuscous, not broken. Abdominal tergites very little narrowed apically, black-fuscous with all segments narrowly margined behind with ochraceous; connexivum black with first three segments ochraceous, last segment subquadrate and only a little smaller than the second. Body beneath pale testaceous with broad, median part of venter blackish fuscous.

Anterior leg dusky brown, paler beneath, without longitudinal stripe on femur; tibia straight without long brown hairs on apical part beneath, slightly shorter than femur, 0.80 mm. long. Middle legs with femur 1.60 mm. long, the tibia 2.62 mm. long, and the tarsus 1.70 mm. long. Hind femur 2.00 mm. long, the tibia 0.95 mm. long and tarsus 0.62 mm. long.

Type (female), Canal Zone, Panama, February 10, 1938, C. J. Drake, netted in a small stream emptying into the Canal.

Distinguished at once from *O. bella*, new sp. by the color markings of pronotum, antennal measurements and lack of a longitudinal black stripe on outer surface of fore femur.

The genus *Ovatametra* Kenaga (1942) now comprises *O. parvula* Drake and Harris (genotype) from Brazil, *O. obesa* Kenaga (1942) from Brazil, *O. fusca* Kenaga (1942) from Brazil and the two new species characterized above from Bolivia and Panama, respectively.

Velia paxilla, new sp.

Apterous form: Brown with base of first antennal segment pale, lateral sides of abdomen partly black, inferior surface of connexiva brownish testaceous. Legs brownish testaceous with distal half of superior surface of femora darker. Male and alate forms unknown. Length, 4.00 mm.; width, 2.50 mm.

Head above plump, clothed with pale pubescence, with longer hairs in front of eyes, with usual impressed median line, entire dorsal surface beset with numerous, short, stout, black, conical spinulae with sharp tips. Antennae moderately long, rather densely pubescent, with longer pubescent hairs on last two segments, segment II slenderer than I, III and IV slenderer than II, measurements—I, 0.75 mm.; II, 0.58 mm.; III, 0.56 mm.; IV, 0.60 mm. Labium testaceous with black tip.

Pronotum 1.28 mm. long, as wide as long, thinly clothed with short pubescence, depressed, without distinct calli, divided by a transverse row of large punctures into two distinct lobes; anterior lobe rectangular in

outline, pitted on posterior part, approximately one-third as long as hind lobe, with numerous, minute, erect, dark, conical setae on transverse, impunctate ridge behind collar, the collar constricted, short, ornated with an encircling row of small, low, rounded tubercles (no pits); hind lobe large, rounded behind humeri, coarsely rugosely pitted, with minute, conical, dark setae on elevated ridge along posterior border. Wing-pads not visible. Abdominal tergites slowly evenly narrowed posteriorly, with a broken pair (one on each side) of carinate ridges on all visible segments except VII, the two ridges somewhat bluish, parallel, extending entire length of segment II, thence progressively shortened and present only on basal part of III to VI (inclusive); connexivum fairly broad, widest near middle, slowly narrowed apically with apex truncate. Legs moderately long, unarmed, with femora scarcely swollen, clothed with short pubescent hairs, inferior face of middle and hind femora with pubescence more abundant and longer; tarsal segment II slightly shorter than III in both middle and hind legs. Pubescence of dorsal surface short and golden.

Holotype (female), Lorenzo, Salta, Argentina, Jan. 10, 1950.

Distinguished at once from *V. brachalis* Stal and other members of the group by the numerous minute, conical, dark spinulae on head and pronotum, lack of long hairs and annulae on legs and especially by the bicarinate dorsal tergites of abdomen.

***Velia nama*, new sp.**

Macropterous male: Head brownish with median longitudinal part in front dark fuscous, with usual impressed median line, transocular width 0.80 mm., vertex at narrowest point subequal to width of an eye. Labium not reaching to middle of mesosternum, testaceous with black tip. Antennae 2.87 mm. long, dark fuscous, shortly pubescent, without long hairs or even bristly hairs on first two segments, measurements—I, 1.00 mm.; II, 0.75 mm.; III, 0.56 mm.; IV, 0.56 mm. Length, 4.90 mm.; width, 1.47 mm.

Pronotum 1.75 mm. long and 1.70 mm. wide, triangularly extended behind humeri, long median carina widened anteriorly between calli, deeply coarsely punctate, each pit within furnished with depressed, silvery white, iridescent, short hairs; calli depressed, each densely clothed with a patch of appressed, silvery white, glittering hairs; median carina and callose hind margins impunctate, sparsely furnished with short, snowy white hairs; collar short, constricted, ornated with an encircling row of large pits; lateral sides of pronotum with two rows of large pits, the first four pits of upper row larger than the others. Mesosternum with a wide, obtusely angulate, deep, longitudinal furrow; metasternum tumid. Abdomen beneath with first three abdominal segments deeply transversely grooved on each side; upper edge of ventral surface of connexivum (base to segment V) equipped with a long and closely-set row (base to segment VI) of some 40 stridulatory pegs, the pegs becoming closer to one another apically; connexivum terminating behind in a sharp spine, triangular in outline from lateral aspect.

Hemelytra 3.10 mm. long, scarcely reaching beyond tip of abdomen, dark fuscous with veins a little raised and darkened; basal two cells and exterior cell beyond outer basal cell furnished with dense rows of transversely appressed, fairly long, silvery white, glittering hairs, the median open apical cell with a small white spot. Veins sparsely furnished with

short, pale decumbent pubescence. Male paramere broadly blade-like, posterior edge sinuate, apex rather sharply rounded. Fore legs dusky testaceous with tibia and tarsus brown or fuscous; femur 1.35 mm. long, the tibia a little shorter and provided with a short apical comb. Middle legs dusky testaceous; femur and tibia nearly equal in length, each 2.00 mm. long; tarsal segment II 1.25 mm. long, III 0.45. Hind femur sordid testaceous with stridulatory patch, postmedian band and apex dark brown or fuscous, not strongly swollen, armed beneath with short, black, irregularly arranged spines, one spine in front of middle, one spine near black band, four or five spines in band and seven or eight spines between band and apex (spines in band and beyond scattered); stridulatory structures arranged in a rectangular patch within, subbasal, composed of numerous longitudinal rows of minute, very closely-set, dark spinulae or spinelike structures; tibia straight, scarcely longer than femora, 1.85 mm. long, unarmed, with apical spur.

Type (male), Quarto Ojos, Rio Piray, Bolovia, June 1, 1957.

Separated at once from the species described below by the different type of stridulatory structures on hind femora and connexiva and the less swollen hind femora and humeral processes.

***Velia alla*, new sp.**

Apterous form: Brown with basal third or more of all femora tending to be brownish testaceous, the hind femora with wide fuscous band situated just behind the middle. Dorsal surface of body and appendages clothed with short pubescence, the hairs on ventral face of all femora and tibiae a little longer. Stridulatory organs present. Female and macropterous forms not known. Length, 4.50 mm.; width, 1.25 mm.

Head with median longitudinal line; labium barely reaching to connexival cavities of middle legs, testaceous with last segment black. Antennae brown, shortly pubescent, measurements—I, 0.19; II, 0.65; III, 0.63; IV, 0.53 mm. Pronotum 1.22 mm. long and 1.37 mm. wide at humeral anglea, with fairly distinct median carina, calli depressed and silvery; humeral angles provided with a fairly large, upright, triangular, spinelike process on each side. Abdomen beneath convex, with the first three segments transversely grooved on each side.

Abdominal tergites slowly evenly narrowed posteriorly to segment VII, then with VII slowly widened and nearly a half longer than VI; connexivum widest on III, IV and V, feebly narrowed on VI, deeply concavely narrowed on VII, terminating behind in a fairly long and acutely angulate projection which extends posteriorly to the end of first genital segment. Male parameres thin, fairly wide, narrowed on both edges apically, with apex blunt and on median line. Stridulatory organs: (1) connexiva (each side) provided with a long row (from base to middle of IV) of a very large number of fine, closely-set, transverse striae which form a rodlike structure extending from base of connexiva (one on each outer side near upper edge) to middle of segment IV and (2) and a stridulatory patch on inner face near the base of hind femora. The latter patch is somewhat obovate with apex almost acutely angulate, equipped with around 50 short, black, peglike structures fairly evenly arranged and spaced.

Fore leg with femur and tibia subequal in length, each 1.15 mm. long, latter with a short, rodlike apical comb. Middle leg with femur 1.80 mm.

long, the tibia 1.90 mm.; tarsal segment II slightly shorter than III (50:40). Hind legs with trochanter provided with numerous dark teeth; femur moderately swollen, 1.65 mm. long, widest near middle, armed beneath with numerous, short, blunt spines (more like teeth), the tooth-like spines more numerous on middle third of segment (there three rows deep), then only a few spines on basal third, also apical third; tibia straight, armed beneath with three rows of teeth on basal half, then diminish to two apically, provided with large apical spur; tarsal segments II and III subequal. Wing pads pale, short.

Type (male). British Guiana (Bartica District), May 25, 1944, netted in a small stream.

Allied to *V. quadrispinosa* Hungerford, but easily separated from it by the elevated humeral angles, male parameres and striated rodlike stridulatory organ of connexival segments.

Euvelia, new gen.

Head short, broad, feebly produced in front of eyes, deflected anteriorly, with median impressed line; eyes fairly large, widely separated, contiguous behind with anterior margin of pronotum. Labium stout, extending a little beyond prosternum. Antennae short, stout, with two or three bristly hairs on segments II and III, all segments of nearly equal thickness and differ from one another very little in length. Pronotum large, strongly extended posteriorly so as to conceal mesonotum except latero-posterior angles; metanotum rather short. Abdominal tergites slowly evenly narrowed posteriorly; connexiva fairly thick, reflexed obliquely upward outward, slowly narrowed apically with last segment subquadrate. Mesosternum very large, longitudinally furrowed. Procoxal cavities rather widely separated from each other, placed near the hind margin of the segment; mesocoxal cavities widely separated from each other, also from procoxae, placed far back on mesosternum; metacoxal cavities more widely separated from each other than middle pair, situated just behind the outer side of middle pair. Legs rather short, stout; tarsi two-segmented. Tarsal segment II of middle legs very deeply cut-out on apical two-thirds so as to leave only a short basal cleft, equipped with four large, thin, pellucid, membranous bladeliike structures attached at the base of the excavation, each blade almost two-thirds as long as the segment. Legs rather short, stout. Male and alate forms unknown.

Type species, Euvelia advena, new sp.

Most closely allied to the Neotropical genus *Husseyella* Herring, but quickly separated from it by the much stouter and shorter antennae with segments of nearly equal in length and thickness and the larger membranous blades of middle tarsi. Up to this time, these are the only two genera of American veliids known to have bladeliike structures on the second tarsal segment of middle legs.

Euvelia advena, new sp.

Apterous form: Black with a little bluish bloom; hind part of head adjacent to eyes, subapical habena of pronotum last five connexival segments (both surfaces), last tergite in greater part and dorsal surface of genital segments reddish brown. Legs testaceous with femora and tibiae lightly brownish, tarsi more infusate. Male and macropterous forms unknown. Length 2.00 mm.; width, 1.25 mm.

Head with impressed median line, vertex twice as wide as an eye. Antennae stout, short, segment II tapering from apex to base, IV fusiform, measurements—I, 17; II, 16; III, 21; IV, 20. (80 units equal 1 mm.) Pronotum very large covering all but lateroposterior angles of mesonotum, wider than long (90:40), strongly sinuate behind, there roundly produced on each side so as to form an excavation at middle, somewhat depressed on median line anteriorly, anterior lobe much shorter than hind lobe. Abdomen above with a few scattered hairs, tergites slowly evenly narrowed posteriorly; connexivum slowly roundly narrowed posteriorly, last segment subquadrate, about half as wide as basal segment, reflexed obliquely upward laterally at an angle of about 45 degrees.

Legs short, stout, unarmed, sparsely pubescent, all trochanters rather long. Anterior femur 0.45 mm. long, with a thin row of long hairs on inferior face; tibia 0.35 mm. long, with a short, blackish, apical comb, the tarsi stout. Middle femur 0.81 mm. long, the tibia 0.75 mm. long; tarsal segment I half as long as II (15:30), taken together half as long as tibia, II provided with four, long, thin, bladelike structures as described under genus. Hind legs with femur 0.50 mm. long; tibia scarcely longer than femur; tarsal segment I about half as long as II (8:18), the latter shallowly excavated beneath at apex of the reception of two claws.

Type (apterous female), Cuarto Ojo, Piray River, Bolivia, April 25, 1957. Separated easily from *Huseyella diffidens* (Drake and Harris) and *H. turmalis* (Drake and Harris) by the shorter and stouter appendages, length of antennal segments and modifications of tarsal segment II of middle legs.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF FOUR NEW VENEZUELAN BIRDS,
EXTENSIONS OF RANGES TO VENEZUELA
AND OTHER NOTES

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

Further study of our collection indicates four new subspecies worthy of description and the extension of ranges of eight species and two subspecies to Venezuela.

We owe our thanks to the Curators of the American Museum of Natural History, the Carnegie Museum, the Chicago Natural History Museum, the Museum of Comparative Zoology and the Museum National d'Histoire Naturelle, Paris, for facilitating the comparison of our material with their collections.

Specimens listed are in the Phelps Collection, Caracas, unless otherwise specified. Names of colors are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature," 1912. Wing measurements are of the chord.

Anous minutus americanus (Mathews)

Megalopterus minutus americanus Mathews, Bds. Australia, 2, p. 423, 1912. (Caribbean Sea, Br. Honduras.)

2 ♀, Islas Los Roques (I. Bequervé), July 1.

This is the first record of the species for Venezuela. These specimens were among a large colony of nesting *A. stolidus stolidus* (Linné).

A single egg was reported by Belcher and Smooker¹ as having been collected on El Soldado Rock, off Trinidad, and Voous² reports that it was once recorded from Bonaire. It is apparently an exceedingly rare species off Venezuela.

Helicolestes hamatus (Temminck)

Falco hamatus "Illiger" Temminck, Nouv. Rec. Pl. Col., livr. 11, pl. 61, 1821. (Brasil.)

1 (?) imm., El Amparo, Río Arauca (Colombian frontier), Apure; collected November 11, 1946, at 100 meters.

This specimen constitutes an extension of range of this species to Venezuela from Colombia (Amazonian) and Brazil. Rusty edgings on wing feathers and scapulars denote immaturity. It is uniformly plumbeous in color with black tail (above) with four white bands.

Accipiter poliogaster (Temminck)

Falco poliogaster "Natterer" Temminck, Nouv. Rec. Pl. Col., livr. 45, pl. 264, 1824. (Brasil; = Ypanema, Sao Paulo.)

¹Birds of the Colony of Trinidad and Tobago. Ibis, p. 296, 1934.

²De Vogels van de Nederlandse Antillen, p. 109, 1955.

1 ♀, Caño Cataniapo, Atures, Terr. Amazonas; collected February 8, 1943, at 100 meters. 1 ♂, Burgua (Camp. Petrolero), southwestern Táchira; collected November 10, 1952, at 350 meters, in forest.

These specimens constitute an extension of range of the species to Venezuela from Colombia (Santa Marta region) and Brazil. They are similar in color except that the male has the sides, flanks and shanks heavily barred and traces of rusty on sides of breast and cheeks.

Buteo swainsoni Bonaparte

Buteo swainsoni Bonaparte, Geog. and Comp. List, p. 3, 1838. (Columbia River, United States; *ex* Audubon.)

1 ♂ (♀) imm., Río Chama, Mérida, September 18, 1939; 2500 (♀) meters.

This specimen constitutes an extension of the winter range of this species, migrant to Venezuela. In South America it was known from Colombia and Brazil.

We have questioned the sex and altitude because, being a Briceño Gabaldón skin, this information is unreliable. The plumage is similar to American Museum of Natural History specimen 51598 juv., Fort Verde, Arizona.

Piaya cayana insulana Hellmayr

Piaya cayana insulana Hellmayr Nov. Zool., 13, p. 43, 1906.

Orinoco Delta: 1 ♂, 2 ♀, San Francisco de Guayo; 2 ♀, Jobure.

These specimens confirm the correctness of Cherrie's³ identification of a "specimen collected at Las Barrancas [Monagas], Delta region" as *insulana*. This record was apparently overlooked by Peters⁴ as he gives the range as "confined to the Island of Trinidad."

Leucippus fallax

Trochilus fallax Bourcier et Mulsant, Ann. Soc. Agric. Lyon, 6, p. 44, 1843. (Colombia.)

The senior author examined the two specimens from "Cayenne" in the Paris Museum and found them similar to a large series of *L. f. richmondi* in our collection from the northeastern coast of Venezuela.

They are a part of a collection made in French Guiana by F. Geay previous to 1904. Simon 1921:318⁵ cites these specimens as well as Ménégau 1904:114⁶ and Berlepsch 1908:265⁷. Both Berlepsch and Simon also cite another specimen from "Cayenne" in the British Museum but the senior author did not find it there in 1951.

Inasmuch as all these specimens lack precise localities and dates we believe they are commercial skins of northeastern Venezuelan origin. As we have not found any more recent records from French Guiana we think the species should not be given a French Guiana range without additional proof.

³Science Bulletin (Brooklyn), 2, No. 6, p. 314, 1916.

⁴Birds of the World, 4, p. 47, 1940.

⁵Histoire Naturelle des Trochilidae. Paris. pp. 416.

⁶Catalogue des Oiseaux rapportés par M. Geay de la Guyane française et du Contesté Franco-Brésilien. Bull. du Muséum d'Histoire Naturelle, No. 3.

⁷On the Birds of Cayenne. Nov. Zool., 15, Pt. 2.

Monasa morphoeus peruana Selater

Monasa peruana Selater, Proc. Zool. Soc. London, p. 194, 1855 (1856). (Chamacurros, Ucayali Valley, Perú.)

12 ♂, 5 ♀, Campamento La Cruz, pica Yavita-Pimichín, Terr. Amazonas.

These specimens extend the range of the species to Venezuela from southeastern Colombia (Caquetá) and Brazil (Rio Negro). The specimens were collected during March, 1946.

Capito niger niger (P. L. S. Müller)

Bucco niger P. L. S. Müller, Natursyst., Suppl., p. 89, 1776. (Type locality not indicated; Cayenne *ex* Buffon.)

2 ♂, 1 ♀, Carabobo, (240 m.), Alto Río Cuyuni, extreme eastern Bolívar, near the British Guiana frontier.

These specimens, collected in September, 1948, extend the range of the subspecies to Venezuela from British Guiana and Brazil.

Capito niger transilens Friedmann

Capito atratus transilens Friedmann, Proc. Biol. Soc. Wash., 58, p. 113, 1945. (Santa Isabel, Rio Negro, Amazonas, Brasil.)

Territorio Amazonas: 1 ♂, 3 ♀, El Carmen, Río Negro; 1 ♀, San Carlos, Río Negro.

These specimens extend the range of the subspecies to Venezuela from Colombia on the Río Negro and from Brazil, also on the Río Negro. The specimens were collected in July and September, 1947. At the same time we collected four specimens across the river in Colombia; see Dugand and Phelps 1948:233⁸.

Capito bourcierii bourcierii (Lafresnaye)

Micropogon Bourcierii Lafresnaye, Rev. Zool., p. 179, 1845. (Bogotá, Colombia.)

1 ♀, Altamira, Barinas (1300 m.); 4 ♂, 1 ♀, Cerro El Teteo, southwestern Táchira (1250, 1300 m.).

These specimens extend the range of the species to Venezuela from the Bogotá region of Colombia.

Piculus rubiginosus rubiginosus (Swainson)

Picus rubiginosus Swainson, Zool. Illust., 1, 1820, pl. 14 and text. ("Spanish Main"; "Cumaná" designated as restricted type locality by Hellmayr, Nov. Zool., 13, p. 38, 1906; Caracas substituted by Hellmayr Vern. Orn. Ges. Bayern, 13, p. 315, note, 1918. We accept Hellmayr's first locality, but as "Los Palmales, Cumaná" instead of "Cumana".)

Anzoátegui: 6 ♂, 3 ♀, Quebrada Bonita; Sucre: 1 ♂, 1 ♀, Los Altos; 3 ♂, Cerro Papelón; 10 ♂, 6 ♀, Cerro Humo; 6 ♂, 1 ♀, Cerro Azul; Monagas: 1 ♀, Cerro Negro; 1 ♂, Caripe.

The material which Hellmayr had in his hands when he made his first designation of "Cumana" consisted of "1 ♂, ad., Los Palmales,

⁸Aves de la Ribera Colombiana del Río Negro (Frontera de Colombia y Venezuela). Caldasia, 5. No. 22, pp. 225-245, Sept. 15, 1948.

Cumaná" and six specimens from Trinidad. By error he omitted "Los Palmares" which is a subtropical locality to the southeast of Cumaná in the Eastern Coast Range in the present State of Sucre, near the border of the State of Monagas. Cumaná is at sea level on the coast.

Cory 1919:438⁹, and Peters 1948:111¹⁰, give the range of *P. r. rubiginosus* including both the Caracas and Cumaná regions. We now restrict the range to the Eastern Coast Range which extends from the Barcelona region, Anzoátegui, to the Paria Peninsula, Sucre, because the birds of the Caracas region are similar to *P. r. meridensis* (Ridgway) of the Mérida region in the principal subspecific character, which is the lack of pronounced barring on the two outer rectrices.

In *P. r. rubiginosus* the barring is pronounced on all specimens. In *P. r. meridensis*, from the Mérida region, the barring is entirely absent from the under surface of the rectrices and only suggested on the upper surface. Specimens from the Caracas region are sometimes intermediate in this respect but they are closer to *meridensis*. We therefore consider the range of *meridensis* to comprise the Caracas region as well as the Mérida and Perijá regions.

Hellmayr, in changing his designation from "Cumaná" to "Caracas" said: "My earlier idea that the type could have come from Cumaná was an obvious error which I, in another place, will explain." We have not been able to find the publication of the promised explanation.

In addition to the 39 specimens of *P. r. rubiginosus*, we have in our collection 102 specimens of *meridensis*, 44 from the Caracas region, 37 from the Mérida region and 21 from the Sierra de Perijá, Zulia. We rectify our error in listing the Caracas specimens as *P. r. rubiginosus* in our paper describing *P. r. paraquensis*, 1947:63¹¹.

***Myiophobus flavicans perijanensis*, new subspecies**

Type: From Cerro Pejochaina, upper Río Negro, Sierra de Perijá, Estado Zulia, Venezuela; 2300 meters. No. 55077, Phelps Collection, Caracas. Adult male collected February 13, 1952, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from *M. f. flavicans* (Selater), of Colombia and Ecuador, by less prominent crown patch, and from *M. f. venezuelanus* (Hellmayr), of Venezuela, by having a blackish mandible instead of flesh colored.

Range: Known from the Sierra de Perijá and from the eastern slopes of the Páramo de Tamá massif, in southwestern Táchira, in forests of the Subtropical Zone at altitudes from 1800 to 2300 meters.

Description of Type: Top and sides of head nearest to Warbler Green, merging into the Citrine of back and the Buffy Citrine of rump and upper tail-coverts; a semi-concealed Lemon Chrome crown patch; inconspicuous eye ring pale yellow; lores dusky. Chin yellowish white; throat, breast, sides and flanks near Pyrite Yellow merging into the Strontian Yellow of abdomen; under tail-coverts Citron Yellow. Wings Benzo Brown; primaries and secondaries narrowly edged basally with buffy olivaceous, the tertials heavily edged to the tips; inner webs of

⁹Catalogue of Birds of the Americas, Part II, No. 2.

¹⁰Check List of the Birds of the World, 6.

¹¹Descripción de seis Aves Nuevas de Venezuela y Notas sobre veinte y cuatro adiciones a la Avifauna del Brasil. Bol. Soc. Ven. Cien. Nat., No. 71, 1947.

remiges edged basally with Light Ochraceous Salmon, progressively more terminally toward tertials; greater wing-coverts broadly edged and tipped with Pinkish Cinnamon forming a prominent wing band; median coverts with a more olivaceous and indistinct band; lesser coverts edged with buffy olive; bend of wing Strontian Yellow; external under wing-coverts yellowish and dusky, interior ones and axillaries pale yellowish. Tail Benzo Brown, paler on under surface. Bill (in life) "black"; feet "greenish-black"; iris "dark". Wing, 66 mm.; tail, 53; exposed culmen, 10; culmen from base, 15; tarsus, 18.

Remarks: Sexes unlike in color, male with longer wing. Size similar to *venezuelanus*. Range of measurements: five adult males—wings, 66-70 (68.2) mm.; tail, 53-57 (55.8); culmen from base, 13-14 (13.6); five adult females—wing, 61-64.5 (62.7); tail, 52-55 (52.8); culmen from base, 13-14 (13.6). Measurements of *venezuelanus*: five adult males (AMNH)—wing, 66.5-68 (66.9); tail, 53-56 (54.4); culmen from base, 13-14 (13.7); five adult females (AMNH)—wing, 61-63 (62); tail, 50-53 (50.8); culmen from base, 12-13.5 (13).

Specimens Examined

M. f. caripensis.—VENEZUELA: Cerro Negro, Monagas, 1 ♀.

M. f. venezuelanus.—VENEZUELA: 19¹²; Queniquea, 2 ♂; Páramo Zumbador, 1 ♂, 1 ♀; Seboruco, 2 ♂, 1 ♀; Valle, 1 ♂; Quintero, 1 ♂; Cerro Niquitáz, 1 ♀; Cubiro, 1 ♂; Colonia Tovar, 1 ♂, 1 ♀; El Junquito, 3 ♂, 2 ♀; Cerro El Avila, 1 ♀, 1 juv.; Guarenas, 1 ♂, 2 ♀.

M. f. perijanus.—VENEZUELA: Cerro Perochaina, Perijá, 6 ♂ (inc. type), 5 ♀; Cerro Mashirampé, 1 ♂; divisoria ríos Macoíta y Apón, 2 ♂, 2 ♀; Río Chiquito, Hda. La Providencia, Táchira, 10 ♂, 13 ♀, 4 (?).

*M. f. flavicans*¹².—COLOMBIA: 28. ECUADOR: 47. PERÚ: 6.

*M. f. superciliaris*¹².—PERÚ: La Legia, 1 ♀.

Mecocerculus minor (Taczanowski)

Leptopogon minor Taczanowski, Proc. Zool. Soc. London, p. 233, 1879. (Tambillo, Perú).

1 ♂, Río Chiquito (Hda. La Providencia), southwestern Táchira; 1800 meters.

This specimen constitutes an extension of range of the species into Venezuela from the Colombian part of the Páramo de Tamá, where one specimen was collected by the Chicago Natural History Museum¹³.

Leptopogon rufipectus venezuelanus, new subspecies

Type: From Río Chiquito, Hda. La Providencia, Estado Táchira, Venezuela; 1800 meters. No. 61303, Phelps Collection, Caracas. Adult male collected January 22, 1955, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from *L. rufipectus* (Lafresnaye) by blacker crown, less olivaceous or brownish; back purer green, less olivaceous.

Range: Known from the type locality in extreme southwestern Táchira.

¹²Specimens in the American Museum of Natural History. For localities see Zimmer and Phelps, Am. Mus. Nov., No. 1657, pp. 2, 3, May 25, 1954.

¹³Cory and Hellmayr, Bds. America, etc., Part V, p. 400, 1927.

in the Subtropical Zone at altitudes of 1800 and 1900 meters, and from adjacent Páramo de Tamá at 2500 meters.

Description of Type: Crown nearest to Olivaceous Black (2), the feathers of forehead, close to culmen, with brownish tips; back and rump Olive-Green; upper tail-coverts Dresden Brown; lores brownish; sides of head dusky olivaceous. Throat and breast Buckthorn Brown; sides and flanks olivaceous; abdomen Citron Yellow; under tail-coverts buffy whitish. Wings Fuscous $\times$ Benzo Brown; primaries and secondaries margined outwardly and basally with olivaceous brown, tertiaries more broadly with olive green; inner webs of remiges, the primaries basally, margined with Pale Ochraceous-Buff; greater and median wing-coverts tipped with dull olivaceous yellow forming two conspicuous bands; under wing-coverts and axillaries Ochraceous-Buff. Tail nearest to Saccardo's Umber; outer webs of rectrices, except exterior ones, margined with olivaceous; inner webs, except median ones, margined dully with buffy.

Bill (in life) "black"; feet "flesh color"; iris, "brown". Wing, 72 mm.; tail, 64; exposed culmen, 10.5; culmen from base, 13; tarsus, 17.

Remarks: Sexes alike in color. Wings and tail of female shorter. Size similar to *rufipectus*. Range of measurements: six adult males (inc. type)—wing, 68-72 (68.3) mm.; tail, 59-65 (62.8); culmen from base, 13-14 (13.5); six adult females—wing, 63-65 (64.5); tail, 54-56 (54.9); culmen from base (5), 13. Measurements of *rufipectus* from Colombia: three adult males—wing, 66-69 (67.3); tail, 61-63 (62); culmen from base 12-13 (12.7); four adult females—wing, 62-68 (64.5); tail, 55-62 (58.3); culmen from base, 13-13 (13).

A fledgling, not fully grown, with wing, 55 mm. and tail, 30, and all remiges with sheaths, is similar in color to the adults. This new bird constitutes an extension of range of the species to Venezuela from Antioquia and the Bogotá region of Colombia.

Specimens Examined

L. r. rufipectus.¹⁵—COLOMBIA: Aguadita, Cundinamarca, 2 ♂ 2 [♀]; "Bogotá," 4 (♀); La Candela, Huila, 2 ♀; La Palma, 1 ♀; Salento, Cauca, 1 ♂; Santa Elena, Antioquia, 1 ♀. ECUADOR: Sumaco Abajo, 3 ♂, 1 ♀; Baeza, 2 ♂, 1 ♀.

L. r. venezuelanus.—VENEZUELA: Río Chiquito, Táchira, 2 ♂, 3 ♀, 1 (♀) juv.; Páramo de Tamá, 1 ♂.

Cyanolyca armillata armillata (Gray)

Cyanocorax armillatus Gray, in Gray and Mitchell, *Genera of Birds*, 2, pl. 74, 1845. ("Bogotá.")

2 ♂, 3 ♀, 1 (♀), Río Chiquito (Hda. La Providencia), southwestern Táchira; 1800 and 1900 meters.

These specimens constitute an extension of range of the species to Venezuela from the Colombian part of the Páramo de Tamá, where two specimens were collected by the Chicago Natural History Museum.¹⁴

¹⁴Cory and Hellmayr, *Bds. Americas, etc.*, Part VII, p. 45, 1934.

¹⁵Specimens in the American Museum of Natural History.

Tangara schrankii venezuelana, new subspecies

Type: From Raudal Capuri, Caño Antabari, Caño Carún, Río Paragua, Estado Bolívar, Venezuela; 300 meters. No. 30714, Phelps Collection, Caracas. Adult male collected April 5, 1945, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Male differs from *T. schrankii* (Spix) in having the yellow rump patch less prominent, less extensive laterally, more confined to median line, of a less pure yellow and with a greenish tint.

Range: Known from the Tropical Zone, from 300 to 900 meters, in the upper Paragua River and from the headwaters of the Caura and Ventuari rivers, in southern Estado Bolívar and eastern Territorio Amazonas.

Description of Type: Forecrown, sides of head, and chin a continuous black mask; anterior eyelids with a ring of stiffened pale green feathers; crown Light Cadmium bordered (anteriorly narrowly, laterally widely, posteriorly through the nape and sides of neck) with bright golden green, lightly speckled with dusky; scapulars and back black the feathers edged with Yellow-Green; rump Lemon-Chrome; upper tail-coverts dusky margined with Yellow-Green. Chin black; upper throat, sides of neck, sides and flanks Yellow-Green; lower throat and center of breast more orange than Lemon-Chrome; abdomen along center line dull greenish yellow; under tail-coverts pale yellow with some dusky markings. Wings Bone Brown; primaries and secondaries edged with Turquoise Green, tertials more broadly with Yellow-Green; inner margins of remiges pale grayish white, basally; primary, medium and lesser wing-coverts edged with Turquoise Green, the greater ones with Yellow-Green; bend of wing Turquoise Green; under wing-coverts grayish white; axillaries pale greenish gray. Tail Bone Brown, under surface paler; rectrices, except the outer ones margined with Turquoise Green, the center ones with Yellow-Green; shafts of rectrices brown on upper surface and white on under.

Feet (in life) "dark gray"; iris "dark"; wing, 68 mm.; tail, 45; exposed culmen, 9; culmen from base, 13; tarsus, 17.

Remarks: Sexes different in color. Size similar to *schrankii*. Range of measurements: four adult males, including type—wing, 67-68 (67.5) mm.; tail 40-45 (42.2); culmen from base, 13-13.5 (13.1); five adult females—wing, 65-67 (65.5); tail, 40-42 (41); culmen from base, 12.5-13 (12.3). Measurements of *schrankii* from Puerto Indiana, Perú: five adult males—wing, 66-71.5 (68.2); tail, 40-42 (40.6); culmen from base, 12.5-13 (12.9).

Description of female. Crown without the orange yellow patch, yellowish green speckled with black; only an indication of yellow on rump; yellow of throat-breast more restricted and more greenish; yellowish of abdomen more greenish.

Description of juvenal male. Similar to adult male but with crown of the female. The specimen in the American Museum of Natural History from opposite Tahuapunto (Brazil), Río Uaupés, Colombia, is a juvenal so the identification is questionable.

Specimens Examined

T. s. venezuelana.—VENEZUELA: Kabadisocaña, Río Ventuari, Terr.

Amazonas, 1 ♂ [juv.]; Maniña, Alto Río Caura, Bolívar, 1 [♂], 1 [♂ juv.]; Sarariña, 1 [♂ juv.], 1 ♀; Cerro Paurai-tepui, La Faisca, 4 ♀; Erebenequén, Río Carún, Río Paragua, 1 [♀]; Raudal Capuri, Caño Antabari, 1 ♂ (type). 1 [♂], 2 ♀; Raudal Guaiquinima, 1 [♂].

T. s. schrankii.¹⁵—COLOMBIA: opposite Tahuapunto (Brazil), Río Uaupés, 1 [♂] juv.; Florencia, 1 ♀. ECUADOR: Río Suno Abajo, 1 ♂; Río Suno, above Avila, 2 ♂, 3 ♀; Napo, 5 ♂, 1 ♂ juv., 1 [♀]; Zamora, 2 ♂, 2 ♂ juv., 4 ♀; Sarayacú, 2 ♂, 1 ♂ [juv.], 1 ♀; San José, 1 ♂; San José Abajo, 1 ♂, 3 ♀; headwaters Río Marañón, 1 [♂], 1 [♀]; Mecas, 2 [♀]; Lagarta, Cocha, 2 ♂, 1 ♂ [juv.], 3 ♀. PERÚ: 92.¹⁶ BOLIVIA: Misión San Antonio, 6 ♂, 6 ♂ [juv.], 4 ♀; Todos Santos, 2 ♂, 1 ♂ [juv.], 3 ♀; San Mateo, 1 ♂, 2 ♀.

Habia rubica perijana, new subspecies

Type: From Barranquilla, Ranchería Julian, Sierra de Perijá, Venezuela; 960 meters. No. 58198, Phelps Collection, Caracas. Adult male collected March 2, 1953, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Nearest to *H. r. coccinea* (Todd) but the male differs from all subspecies of *H. rubica* by brighter red breast and brighter, more extensively red, abdomen; differs additionally from *coccinea* by lighter, brighter red upper parts.

Range: Known from the Sierra de Perijá from the upper Río Negro to Cerro Alto del Cedro, at the northern extremity of the range; in the upper Tropical Zone at altitudes from 450 to 1300 meters.

Description of Type: Forehead and sides of crown nearest to Claret Brown; a prominent wide Scarlet-Red crown patch extending to the nape; back, rump and sides of head Garnet Brown. Chin and throat Scarlet-Red; breast Scarlet, duller on abdomen and under tail-coverts; sides, flanks and thighs with a brownish tint. Wings Benzo Brown; outer vanes of remiges brighter than Garnet-Brown; primary upper wing-coverts edged with dull red, the rest of the coverts brighter than Garnet-Brown; inner vanes of remiges Grenadine Pink basally, progressively more extensive terminally towards tertials; bend of wing like abdomen; under wing-coverts and axillaries Grenadine Pink. Tail and upper tail-coverts Morocco-Red; under surface of tail gray; shafts of rectrices blackish brown on upper surface, white on under.

Bill (in life) "maxilla black, mandible brown"; feet "brown"; iris "dark". Wing, 91 mm.; tail, 77; exposed culmen, 16; culmen from base, 21; tarsus, 24.5.

Remarks: Sexes unlike in color, males with longer wings and tail. Size similar to *coccinea*. Range of measurements: five adult males—wing, 88-91 (89) mm.; tail, 77-78 (77.6); culmen from base, 19-21 (19.6); two adult females—wing, 81-85 (83); tail, 70-74 (72.4); culmen from base, 19-20 (19.5). Measurements of *coccinea* (topotypicals from Colombia): three adult males—wing, 89-93 (90.3); tail, 78-80 (78.7); culmen from base, 19-20 (19.7); two adult females—wing, 81-81 (81); tail, 71-74 (72.5); culmen from base, 19-20 (19.5).

The adult female is brownish olive above, the tail more olivaceous, and with a semi-concealed orange crown patch; throat and breast brown-

¹⁶For localities and sexes see Zimmer, Am. Mus. Nov., No. 1245, Dec. 17, 1943, p. 2.

ish buffy; sides, flanks and abdomen paler; under tail-coverts like throat.

The juvenal plumage is darker brown above without crown patch and the tail is more or less reddish; below it is uniform light brown throughout. The many intermediate plumages of the species, both in male and female, are very complex and have been described by Zimmer in his *Studies of Peruvian Birds*.¹⁷ During all these changes the male is not different except when acquiring his all red plumage.

Specimens Examined

H. r. rubica.—BRAZIL: 6 ♂¹⁵, 3 ♂¹⁸. ARGENTINA: 3 ♂¹⁵, 1 ♂¹⁸.

H. r. bahiae.—BRAZIL: 2¹⁵.

H. r. amabilis.—BOLIVIA: 16 ♂¹⁸.

H. r. peruviana.—PERÚ: 15¹⁹, 3 ♂¹⁸.

H. r. hesterna.—BRAZIL: 66¹⁹.

*H. r. rhodinolaema*¹⁹.—BRAZIL: 3. ECUADOR: 7. PERÚ: 2.

H. r. rubra.—VENEZUELA: 23¹⁹; Cerro Azul, 1 ♀; Cerro Humo, 1 ♂, 1 ♀; Cerro Papelón, 7 ♂, 1 ♂ juv., 6 ♀, 2 ♀ juv.; Bergantín, 4 ♂, 1 ♀, 2 ♀ juv., 2 (♀); Los Altos, 1 ♂. TRINIDAD: 17¹⁹, 1 ♂¹⁸.

H. r. coccinea.—VENEZUELA: La Azulita, 1 ♂²¹, 1 ♂¹⁵, 2 ♂²⁰, 1 ♀ juv.²⁰; Cerro El Cogollal, 1 ♂, 1 ♀ imm.; Burgua, 8 ♂, 1 ♂ imm., 2 (?) juv. COLOMBIA²⁰: La Colorada, Boyacá, 2 ♂ (inc. type), 2 ♀; Palmar, 1 ♂.

H. r. perijana.—VENEZUELA: Kunana, Perijá, 4 ♂, 1 ♀ imm.; Baranquilla, Perijá, 5 ♂, 1 ♂ imm., 2 ♀, 4 ♀ imm. VENEZUELA AND COLOMBIA²²: Cerro Alto del Cedro, Sierra de Perijá, 4 ♂, 3 ♂ imm., 2 ♀ imm.

H. r. vinacea.—PANAMÁ¹⁵: 64. COSTA RICA: 14 ♂¹⁸.

H. r. alfaroana.—COSTA RICA: 2 ♂¹⁸, 15¹⁵. NICARAGUA: 3 ♂¹⁵.

*H. r. confinis*¹⁵.—NICARAGUA: 9. HONDURAS: 27.

*H. r. rubicoides*¹⁵.—GUATEMALA: 16. MEXICO: 5.

H. r. affinis.—MEXICO: 3¹⁵.

H. r. nelsoni.—MEXICO: 2 ♂¹⁵.

H. r. rosea.—MEXICO: 3¹⁵.

¹⁷Am. Mus. Nov., No. 1304, p. 9, Dec. 28, 1945.

¹⁸Specimens in Chicago Natural History Museum.

¹⁹For list of specimens and localities see Zimmer, Am. Mus. Nov., No. 1304, pp. 11, 12, Dec. 28, 1945.

²⁰Specimens in Carnegie Museum.

²¹Specimens in Museum of Comparative Zoology.

²²The collecting camp was on the boundary. See Phelps and Phelps, Jr., Proc. Biol. Soc. Wash., 68, p. 20, May 20, 1955.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW BRAZILIAN THYSANOPTERA

By J. DOUGLAS HOOD

The following descriptions are presented with some reluctance, because there seems to be no way by which they can be accompanied by illustrations. However, carefully-made measurements have been given; and these, especially in the case of the head, could quickly be plotted on coordinate paper to form a moderately satisfactory picture, especially if a worker's experience has given him some familiarity with the particular genus or larger group. In any event, measurements are essential to any proper treatment of the species in this order of insects, and their omission from some current descriptions interposes difficulties in the path of other workers.

Measurements are in microns, except as otherwise stated. Almost invariably they are of the holotype, but have occasionally been supplemented by those of a topotypic paratype. Types, as usual, are in the author's collection.

Erythrothrips loripes, sp. nov.

Like *costalis* and *brasiliensis* in that the fore wings have a narrow, dark, costal band in addition to the broad band along posterior margin; but agreeing only with the former of these in having the head long (1.4 times as long as the width across eyes), differing from it in that the hind femora are strongly bent or curved at base, and the hind tibiae have a dense brush of long, roughened hairs extending along most of inner surface.

♂ (macropterous).—Length about 2.5 mm. (fully distended, 2.9 mm.). Color nearly uniform blackish brown, with red internal pigmentation, head somewhat darker; legs concolorous with body; fore wings blackish brown in about posterior half (including anal lobe), with a narrow dark line along costal margin in distal two thirds, and with a paler submarginal basal dark line which disappears at about middle of wing; antennae blackish brown except for the yellowish apical portion of segment II and the similarly colored basal two-fifths of III. Head 302, across eyes 216, just behind eyes 209, in front of basal collar 181, across basal collar 182, width in front of eyes 108; surface finely and closely cross-striate; eyes 102 long dorsally, 65 wide, 86 apart, ventrally prolonged and 127 long, 85 apart posteriorly, 66 wide; median ocellus 23, posterior ones 26, these last

36 apart and 30 from median; mouth-cone extending 126 beyond posterior dorsal margin of head, maxillary palpi 7-8 segmented. Antennal segments: I 60 (50), II 72 (39), III 185 (37), IV 159 (37), V 110 (35), VI 103 (33), VII 76 (31), VIII 31 (17), IX 17 (9). Prothorax 210, across coxae 294, exclusive of coxae 274, its structure and that of pterothorax normal; metanotal pelta somewhat elevated, sculptured throughout in the usual manner. Legs normal, except that the hind femora are curved strongly inward from near base, and the hind tibiae have a dense brush of roughened hairs extending along inner surface from near base, these hairs gradually decreasing in length toward apex of tibiae. Fore wings normal, 1270. Abdomen normal, without lateral flanges or lobes at sides of terga, VIII with anterior margin shallowly emarginate and its posterior margin deeply and roundly emarginate, IX with anterior margin deeply emarginate; seta I on IX 196, II 276, I-III on X each about 280.

BRAZIL: Nova Teutonia, S. C., Fritz Plaumann, May 20, 1949, 1 ♂ (holotype) without further data; and January, 1954, 1 ♂ from grasses.

Echinothrips asperatus, sp. nov.

Unlike all known congeners in that the third to fifth abdominal sterna are pale and membranous medially in about posterior two-fifths or one-half of median third (the second sternum less extensively weakened), and in having the large setae on fore wings, head, and pronotum asperate, rather than knobbed or pointed.

♀ (macropterous).—Length about 1.2 mm. (fully distended, 1.4 mm.). Color dark brown, with red internal pigmentation; fore legs yellow, lightly shaded at middle of femora; mid and hind tarsi and distal halves of their tibiae yellow, remainder of legs dark brown except for paler bases of femora; fore wings light gray; antennae dark brown in segments I and II, somewhat paler in VI-VIII, remainder pale yellow with III shaded in constricted portion just beyond pedicel and V very lightly shaded apically. Head 150, across eyes 148, greatest width across cheeks 139, at base 118, across frontal costa 20; cheeks slightly concave, serrate in about basal half, sculpture and chaetotaxy normal (much as illustrated for *subflavus*), but with the larger setae asperate, a few of the reticles roughened; mouth-cone and maxillary palpi normal. Antennal segments: I 23 (30), II 41 (27), III 54 (16), IV 44 (16-17), V 48 (16), VI 57 (16), VII 17 (8), VIII 26 (6); segments normal in form, chaetotaxy, and disposition of sense-cones, except that the stout subapical dorsal setae on II are asperate in about apical half. Prothorax 110, across coxae 180; sculpture of pronotum normal; major setae asperate, the outer and inner pairs at posterior angles largest and respectively about 59 and 40; fore wings 840, costa with 17 long setae, vein with 13-14, these (excepting the two apical ones on costa) asperate in apical half or more, those at middle of costa about 94, at middle of vein 70. Abdomen remarkable in that sterna II-V are emarginate posteriorly, the emargination of II narrow, that of III-V extending nearly to middle of sclerite and occupying about one-third of its width, these areas pale, somewhat irregular, and apparently membranous; sculpture normal, terga II-VI with numerous long microtrichia arising from the more posterior raised lines at sides; setae normal, disposed as usual, not asperate apically.

BRAZIL: Nova Teutonia, S. C., 1954, Fritz Plaumann, 1 ♀ (holotype) under fallen leaves.

***Pseudothrips interruptus*, sp. nov.**

Very close to *spadix*, but with the comb on posterior margin of seventh abdominal tergum broadly interrupted at middle.

♀ (macropterous).—Length about 2.5 mm. (fully distended, 2.9 mm.). Color brown, paler in basal abdominal segments, shading to blackish brown in sides of last two abdominal segments; legs about concolorous with body, with tarsi, trochanters, both ends of all tibiae, sides of fore femora and tibiae, and bases of all femora, yellow; fore wings pale brown, lighter medially, anal lobe not darkened; antennae with segments I and II blackish brown, III yellow in pedicel and pale yellowish brown beyond, IV yellow at base, somewhat darkened to third whorl of microtrichia, rather abruptly blackish brown in remainder, V with pedicel dark, then yellow to first whorl of microtrichia, somewhat darkened to second whorl, its remainder and VI-IX blackish brown. Head 183 from base of cheeks to tip of front, 196 across eyes, 183 just behind eyes, 189 across cheeks, 175 across base; surface lightly striate in front of ocelli, smooth between them, and distinctly cross-striate behind them, the evenly rounded cheeks serrate; interocellar setae 58, dark and strong; eyes about 109. Pronotum 176, its width 238; surface with a few obscure cross-striae along front and hind margins and a dark line marking the posterior margin of a groove which is concentric with posterior margin; one pair of long setae at posterior angles, this 101 and nearly black; posterior margin with four pairs of setae, the mediad one 31; anterior angles with two pairs of moderately large setae, the upper 35. Mesothorax 283 across anterior angles, 340 in greatest width; anterior metanotal sclerite very sharply polygonally reticulate, the lines fine; fore wings 1040, with about 32 strong dark setae on costa, 22-25 on anterior vein, and 17-19 on posterior one. Abdomen 392 at segment IV; terga II-VII with posterior margin fringed at sides with microtrichia (only a few on the more basal terga), VIII with a complete comb; setae conspicuous, nearly black, I-III on IX respectively 161, 178, and 180, I-III on X 148, 157, and 133.

♂ (macropterous).—Much paler than female; front of head nearly colorless, its remainder much darker than the brownish yellow thorax; pronotum with obscure brown shading which includes a cloud extending toward anterior angles from middle; legs yellow, with middle portions of all femora and tibiae shaded; antennae with segments I and II largely gray, III yellow but very lightly shaded in its narrowed apex, IV and V nearly one-half yellow, except for the dark pedicel of V. Abdomen with microtrichia and the comb on tergum VIII as in female; sterna III-VIII each with a large, pale, transversely-elliptical glandular area; tergum IX with a pair of stout, thorn-like setae behind middle, posterior margin with a median tooth.

BRAZIL: Nova Teutonia, S. C., May 20 and November 17-18, 1949, Fritz Plaumann, 1 ♀ (holotype, taken May 20) and 3 ♂ ♂ (including allotype, taken May 20), from a plant which has not yet been determined.

***Udeothrips*, gen. nov.**

(*oudas*, surface of the ground; *thrips*—in allusion to the habitat)

Allied to *Malacothrips* Hinds, but differing particularly in the large, finely-faceted eyes, which are close together and between which are five

pairs of setae, three of them in the ocellar area, two behind it. Head moderately long, somewhat broader across eyes than across cheeks, deeply incised behind eyes; eyes finely faceted, much broader than their interval, inner margins slightly sinuate; postocular setae normal, knobbed; other setae small and pointed, three pairs anterior to the paired ocelli, two pairs behind ocelli between eyes; surface of head completely sculptured with striae and reticles; mouth-cone moderately short, labium rounded. Antennae 8-segmented, terminal segment pedicellate, setae all pointed, sense-cones long. Prothorax normal, very delicately reticulate almost throughout; epimeron not fused with notum; antero-marginal setae well developed, coxal present, all knobbed; legs normal but slender, fore tarsi of female nearly or quite unarmed; wings nearly straight, at middle slightly narrowed and with the usual small pocket, with a few accessory setae on posterior margin, the three subbasal setae subequal and knobbed. Abdomen normal, with the usual wing-retaining setae, most of its dorsal surface very delicately polygonally reticulate; major setae largely knobbed; tube much shorter than head, not thickened, nearly smooth.

Type species: *Udeothrips vigilatus*, sp. nov.

***Udeothrips vigilatus*, sp. nov.**

♀ (macropterous).—Length about 1.7 mm. (fully distended, 2.1 mm.). Color yellow, cheeks edged with brown, ocellar area lightly shaded, tube brownish yellow in basal two-fifths and abruptly gray beyond; legs concolorous with body; fore wings brown but paler basally (except for anal lobe) as well as at middle and again at tip; antennae brown in segments I and II, yellow beyond, the segments beyond III shaded with brown except at base. Head 280 μ long, 182 across eyes, 154 just behind eyes, 178 across cheeks, 161 near base, 162 at basal collar, 78 across head-process; dorsal surface completely but delicately sculptured, polygonally reticulate in ocellar area, between eyes, just behind eyes, and narrowly across base, the cheeks and remainder closely cross-striate, the cheeks thus serrulate in dorsal aspect; postocular setae straight, expanded apically, 63 long, 99 apart, 30 from eyes; other setae short and pointed, two or three genal pairs borne on low eminences; eyes 114 long, 68 wide, 47 apart; ocelli close together, interval between posterior pair less than their diameter. Antennal segments: I 40 (41), II 56 (33), III 80 (28), IV 70 (26), V 70 (22), VI 69 (20), VII 57 (19), VIII missing in type; sense-cones (major) on III and IV 1 (1). Prothorax 120, across coxae 321, surface completely but very inconspicuously polygonally reticulate excepting the cross-striate posterior margin; mesonotum cross-striate, pelta of metanotum delicately reticulate; all setae present, straight, expanded at tip, antero-marginals 36, antero-angulars and mid-laterals 49, epimerals 64, postero-marginals 45, coxals 32; fore wings with 5 accessory setae. Abdomen 322 at segment IV; tube 120, across basal collar 72, at tip 37, terminal setae 224; IX with setae pointed, I 90, II 125.

BRAZIL: Rio Caraguatá, Matto Grosso, 1953, Fritz Plaumann, 1 ♀ (holotype) from fallen leaves.

***Pleurothrips*, gen. nov.**

(*pleura*, side; *thrips*—in allusion to the dorso-pleural line of abdomen)

Allied to *Eurythrips* Hinds, but differing particularly in the large, finely-faceted eyes, longer mouth-cone, moderately large antero-marginal

prothoracic setae but greatly reduced antero-angulars, very small and narrow metanotal scutellum, elongated abdominal sterna VII and VIII, slender legs, and, especially, in the dorsal position of the dorso-pleural line on abdominal segments II-VII. Head incised behind eyes, the latter as long as their distance from base of head; mouth-cone more than one-half the length of head, not narrowed basally, rounded at tip. Antennae 8-segmented, last segment somewhat narrowed at base, all setae pointed. Pronotum virtually without sculpture, fused with epimeron; legs slender, fore tarsi unarmed in both sexes; wings somewhat curved, at middle scarcely narrowed and without pocket, posterior margin with a few accessory setae, the three subbasal setae subequal and knobbed; metathoracic scutellum lobate, much narrower than scutum. Abdomen slender, with terga II-VII not attaining lateral margin, the dorso-pleural line thus paralleling the margin dorsally; sigmoid wing-retaining setae present on terga II-VII; tube much shorter than head, not thickened, nearly smooth.

Type species: *Eurythrips collaris* Hood.

Schazothrips, gen. nov.

(*schazos*, to let go or let loose; *thrips*—in allusion to the lack of wing-retaining setae even in macropterous individuals)

Allied to *Malacothrips* Hinds. Head moderately long, slightly produced, deeply incised behind eyes, the latter thus strongly protruding; head very lightly reticulate at extreme base dorsally, more strongly so in ocellar area, along cheeks, and posterior to eyes; postocular and post-ocellar setae about equal, moderately strong, knobbed; eyes moruloid, coarsely faceted; mouth-cone short, broadly rounded. Antennae 8-segmented, terminal segment pedicellate, setae and sense-cones long and pointed. Prothorax normal; epimeron not fused with notum; antero-marginal and the other usual setae well developed, coxal present, all knobbed; legs normal, fore tarsi of female with a slight projection at middle of inner surface, those of male with a strong tooth; wings nearly straight, slightly narrowed at middle, without accessory setae on posterior margin, the three subbasal setae subequal and knobbed. Abdomen remarkable in lacking sigmoid wing-retaining setae, their homologues small and straight; median tergite of segment I reticulate, as is most of tergum II, remainder of abdomen lightly sculptured only at sides; major setae mostly knobbed; tube much shorter than head, not thickened, with faint scallop-like reticulation.

Type species: *Schazothrips anadenus*, sp. nov.

Schazothrips anadenus, sp. nov.

♀, *forma macroptera*.—Length about 1.9 mm. (fully distended, 2.3 mm.). Color yellow; second abdominal segment darkened with brown or gray, but paler posteriorly, especially at middle; ocellar area lightly shaded with brown; legs concolorous with body; antennae brown, paler and more yellowish in first two segments, yellow at base of third, remainder dark brown; fore wings nearly uniform brown. Head 290 μ long, 172 across eyes, 134 just behind them, 175 across cheeks, 155 near base, 165 across basal collar, width of head-process 95; head prominently reticulated in groove back of eyes; postocular setae knobbed, 47 long, 135 apart, 44 from eyes; postocellar setae similar, about 52 long and 55

apart; eyes with 5 or 6 lateral facets. Antennal segments: I 46 (47), II 57 (35), III 66 (32), IV 66 (31), V 69 (28), VI 61 (24), VII 57 (23), VIII 41 (14); sense-cones on III 1 (2), IV 2 (2). Prothorax about 144 long, 336 across coxae, with a few marginal lines of sculpture; antero-marginal setae 37, antero-angular 43, midlateral 45, epimeral 62, postero-marginal 45, coxal 53, all knobbed; mesothorax 343 across anterior angles; fore wings 910; fore tarsi with a slight thickening at middle of inner surface; pelta of metanotum subtriangular, distinctly reticulate. Abdomen 365 at segment IV; median tergite of I about semicircular, reticulate; II reticulate except posteriorly, many of the reticles mucronate, the succeeding segments with some slight sculpture; terga without sigmoid wing-retaining setae; tube 146, across basal collar 87, at tip 39, terminal setae 147; seta I on IX 121, II 155, both pointed but rapidly tapering at tip.

♀, *forma aptera*.—Color and structure apparently identical with that of long-winged form, except for the absence of ocelli; eyes little or no smaller.

♂ (apterous).—Length about 1.6 mm. (fully distended, 2.0 mm.). Color and structure as in long-winged female, but with fore tarsi strongly toothed at base; sterna without glandular areas.

BRAZIL: Nova Teutonia, S. C., May, 1953, to October, 1955 (holotype and allotype on latter date); Erechim, Rio Grande do Sul, August, 1956. All specimens (63 ♀♀ and 30 ♂♂) were taken by Mr. Fritz Plaumann from fallen leaves.

Eurythrips alarius, sp. nov.

Agreeing only with the following species (*peccans*) in having both pairs of setae on anterior margin of pronotum reduced in size; differing from that species in having head and most of body blackish brown, tube dark brown, with its two basal pores dorsal in position, and fourth antennal segment with only one sense-cone on inner surface, most unusual in that only the third subbasal wing-seta is large (in macropterous form).

♀ (macropterous).—Length about 1.7 mm. (fully distended, 2.2 mm.). Color light blackish brown, darker toward tip of abdomen, with metathorax much paler and yellowish; tube dark blackish brown but paler across base and apically; head darker than prothorax, abdominal terga II-VIII shaded along posterior margin; legs pale yellowish, femora somewhat shaded with brown; fore wings gray-brown, paler at base in front of anal lobe, and with a pale streak paralleling posterior margin in apical half; antennae with segment I and base and sides of II concolorous with head, remainder gray-brown with apical portion of II and pedicel of III yellow, the more apical segments darkest. Head 203, across eyes 144, just behind eyes 138, across cheeks 160, near base 158, across head-process 80; surface nearly smooth, with a few striae behind eyes and along sides, briefly reticulate across base; setae normal, postoculars 79, dull at tip, interval 148, distance from eyes 20; eyes 63, about 44 wide, about 56 apart; mouth-cone normal, 90. Antennal segments: I 39 (42), II 51 (34), III 63 (34), IV 60 (34), V 60 (32), VI 52 (30), VII 41 (23), VIII 40 (17), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 123, across coxae 280, pronotum with a few faint striae along posterior margin; antero-marginal setae vestigial, antero-angulars 33 and finely pointed, midlaterals 85, epimerals 93, postero-marginals 97 (all of these

dull at tip), coxals pointed, 27; mesothorax 290 across anterior angles; pelta of metanotum slightly elevated, outlined by reticulation, almost perfectly smooth medially; fore tarsi toothed on inner surface. Abdomen 357 at segment IV, nearly smooth, most setae dull or very slightly broadened at tip; tube 140, across base 73, at tip 37, terminal setae 85; setae on IX pointed, I 130, II 170.

BRAZIL: Nova Teutonia, S. C., November 1956, Fritz Plaumann, 1 ♀ (holotype), under fallen leaves.

Eurythrips peccans, sp. nov.

Agreeing only with the preceding species (*alarius*) in having both pairs of setae on anterior margin of pronotum reduced in size; differing from that species in having head and most of body yellow, tube nearly or quite yellow (but tipped with gray), with its two basal pores lateral in position, and fourth antennal segment with two sense-cones on inner surface.

♀ (brachypterous).—Length about 1.3 mm. (fully distended, 1.7 mm.). Color golden yellow (with red internal pigmentation), prothorax and front and sides of mesothorax darkened, abdomen brown in segment II and often darkened in some of following segments, tube yellow, tipped with gray; coxae brown, femora shaded except apically, tibiae and tarsi yellow; antennae yellow in segments I, II, and basal third of III, remainder blackish brown. Head 182, across eyes 130, behind eyes 120, across cheeks 142, near base 133, across head-process 80; surface rugose-reticulate in ocellar area, lightly reticulate across base, cheeks striate and rather strongly serrate, remainder smooth; postocular setae 48, slightly widened at tip, interval 84, distance from eyes 23; eyes 46, width 33, interval 64; mouth-cone normal, 57. Antennal segments: I 40 (39), II 46 (33), III 59 (33), IV 56 (33), V 51 (30), VI 50 (27), VII 42 (24), VIII 37 (14), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 118, across coxae 252, pronotum with a few striae along posterior margin, remainder smooth; antero-marginal and antero-angular setae vestigial, 3 or 4 long, midlaterals 52, epimerals and postero-marginals 67, coxals 28, these all slightly dilated at tip; mesothorax 238 across anterior angles; metanotum without well-differentiated pelta, nearly smooth; wing-pads minute, nearly circular, with one long seta; fore tarsi with a minute tooth on inner surface. Abdomen 281 at segment IV; median tergite of I lightly reticulate anteriorly; remainder of dorsal surface nearly smooth; tube 113, across base 68, at tip 33, terminal setae 74; most setae slightly broadened apically, those on IX pointed, I 116, II 131.

♂ (brachypterous).—Like ♀ in color; glandular area on sternum VIII confined to a narrow band along anterior margin.

BRAZIL: Nova Teutonia, S.C., May 1953–October 1955, Fritz Plaumann, 19 ♀ ♀ and 1 ♂ (including holotype and allotype taken in April 1954), from fallen leaves.

Eurythrips pusillus, sp. nov.

Distinctive because of small size (1.4 mm. long when well distended, head only 136 μ), presence of two sense-cones on inner surface of segment IV of antennae (in both long- and short-winged forms), and pointed post-ocular and prothoracic setae.

♀, *forma macroptera*.—Length about 1.1 mm. (distended, 1.4 mm.). Color yellowish brown throughout, tube not paler at base nor apically, darkest in fore coxae and along sides of thorax; femora somewhat paler than body and yellow at either end, tibiae paler, yellow at tip, tarsi yellow; fore wings brown throughout; antennae concolorous with head in segments I and II, III-VIII blackish brown, III paler than those beyond and with pedicel yellow. Head 136, across eyes 111, behind eyes 103, across cheeks 117, near base 109, across basal collar 114, across head-process 68; surface obscurely reticulate in ocellar area, cheeks widely cross-striate, remainder smooth; postocular setae 48, pointed, interval 80, distance from eyes 13; eyes 40, width 31, interval 48; mouth-cone normal, 69. Antennal segments: I 34 (33), II 43 (27), III 40 (29), IV 40 (27), V 45 (27), VI 43 (24), VII 36 (20), VIII 41 (14), sense-cones on III 1 (2), IV 2 (2), all setae pointed. Prothorax 94, across coxae 216, pronotum smooth, without striae along posterior margin; antero-marginal setae very fine and 18 long, anteroangulars 41, midlaterals 38, epimerals and postero-marginals 68, coxals 15, all pointed; mesothorax 224 across anterior angles; metanotum with slightly elevated triangular pelta whose sides end posteriorly at the two major setae, surface smooth; fore tarsi with minute tooth on inner surface. Abdomen 251 at segment III, median tergite of segment I smooth, remainder of dorsal surface almost smooth; tube 104, across base 63, at tip 31, terminal setae 76; all setae pointed, IX with I and II 119-123.

♀, *forma brachyptera*.—Paler than macropterous form, especially head and tube, these nearly yellow, the latter gray at tip; legs little or not shaded; antennae concolorous with head in segments I and II, remainder often nearly black, with III yellow in pedicel but often paler throughout.

BRAZIL: Nova Teutonia, S.C., May 1953 to October 1955, 8 ♀♀ (1, the holotype, macropterous, taken in February 1954, the others brachypterous); Erechim, Rio Grande do Sul, August 1956, 1 brachypterous ♀. All were taken from fallen leaves by Fritz Plaumann.

Eurythrips conformis, sp. nov.

Close to *costalimai*, agreeing with it in the thoroughly normal size and placement of the pronotal setae, the relatively smooth head, the presence of two sense-cones on outer surface of third antennal segment, the brown fourth and fifth antennal segments, and the smooth metanotum; but with head and body largely golden yellow, submedian setae on abdominal terga II and III dark and fully one-third the length of segment, more slender antennae, and longer tarsal tooth.

♀ (brachypterous).—Length about 1.3 mm. (fully distended, 1.7 mm.). Color golden yellow (with red internal pigmentation), prothorax slightly darkened, pterothorax much darker (especially along sides), abdomen shaded with brown along sides, along posterior margins of terga, and with a brown cloud behind antecostal lines on intermediate terga, IX dark brown along sides and posteriorly, tube dark brown but narrowly yellow across base and paler apically; legs yellow; antennae brownish yellow in segments I and II, remainder blackish brown except yellow pedicel of III. Head 170, across eyes 118, just behind eyes 111, across cheeks 133, near base 130, at basal collar 132, across head-process 75; surface obscurely reticulate in ocellar area, distinctly so across base, cheeks transversely striate, remainder nearly smooth; setae normal,

postoculars 52, expanded at tip, interval 86, distance from eyes 15; eyes 41, width about 29, interval 60; mouth-cone normal, 65. Antennal segments: I 40 (36), II 50 (30), III 57 (28), IV 50 (29), V 50 (27), VI 48 (23), VII 43 (20), VIII 43 (13), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 113, across coxae 245, pronotum with a few faint striae along posterior margin; antero-marginal setae minute, antero-angulars 48, midlaterals 43, epimerals 59, postero-marginals 62, coxals 40, all of these dilated at tip; mesothorax 228 across anterior angles; metanotal pelta broad, differentiated only by a few lines of reticulation laterad of the two major setae, metanotum otherwise smooth; fore tarsi with the usual moderately long recurved tooth on inner surface. Abdomen 330 at segment IV, nearly smooth, most setae dilated at tip; tube 120, across base 70, at tip 34, terminal setae 74; setae I and II on IX blunt or rapidly tapering at tip, 127-129.

BRAZIL: Nova Teutonia, S.C., July 1953 to October 1955, 8 ♀♀ (holotype taken in September, 1954); Erechim, Rio Grande do Sul, August 1956, 1 ♀. All specimens were collected by Fritz Plaumann from fallen leaves.

Eurythrips musivi, sp. nov.

Like the following species (*striolatus*), only, in having the head completely sculptured medially, from occipital line to median ocellus; differing from that species in that the head is polygonally reticulate (rather than striate with widely-spaced anastomosing lines) between the postocular and occipital setae, the cheeks evenly curved to eyes and toward base, the width just behind eyes only slightly (4μ) less than that in front of basal collar, the antennae more slender (segment IV nearly 2.5 times as long as wide), and seta I on abdominal segment IX dilated at tip.

♀ (macropterous).—Length about 1.6 mm. (fully distended 2.1 mm.). Color brown, darkest in head and tube, the former somewhat paler basally, the latter paler across base and in apical two-thirds; pterothorax nearly yellow dorsally; abdomen pale brownish yellow in segments I-IX, shaded along sides with gray (especially in II) and with a dark gray cloud margining the antecostal line in III-VII; legs yellow, with femora slightly darkened; fore wings brown, slightly darker marginally and in anal lobe, pale in front of latter at base, and with a more or less evident dark median streak; antennae brown, darkest in segments I and II, pedicel of III yellow. Head 203, across eyes 152, just behind eyes 136, across cheeks 156, near base 140, across basal collar 143, across head-process 85; surface polygonally reticulate throughout, save for a small patch on each side, adjoining postocular setae, these 85, dilated at tip, 112 apart, and 18 from eyes; eyes 70, width 46, interval 61; mouth-cone normal, 66. Antennal segments: I 42 (43), II 56 (34), III 70 (31), IV 67 (29), V 70 (27), VI 60 (24), VII 53 (21), VIII 50 (14); sense-cones on III and IV 1 (2), all setae pointed. Prothorax 114, across coxae 273, pronotum with a few faint striae along posterior margin, remainder smooth; antero-marginal setae 26, close together, slender, pointed, antero-angulars 88, midlaterals 90, epimerals 89, postero-marginals 98, coxals 36, these major setae all dilated at tip; mesothorax 269 across anterior angles; metanotum with somewhat elevated pelta which is polygonally reticulate throughout; fore tarsi with a small tooth on inner surface; fore wings 879. Abdomen 353 at segment IV; median

tergite of I reticulate throughout; remainder of dorsal surface nearly smooth; tube 143, across base 79, at tip 40, terminal setae 103; most setae broadened apically, I on IX 122, dilated at tip, II 137 and pointed.

BRAZIL: Nova Teutonia, S.C., May 1953 and April and May 1954, Fritz Plaumann, 4 ♀♀ (including holotype taken in May 1953), under fallen leaves.

***Eurythrips striolatus*, sp. nov.**

For separation of this species, see description of *musivi*, above.

♀ (macropterous).—Length about 1.5 mm. (partially distended, 1.9 mm.) Color brown, usually darkest in head, first abdominal segment, and tube (the tube paler across base and in about apical half), metathorax pale and nearly yellow, intermediate abdominal segments dull brownish yellow but darkened laterally, especially in region of antecostal line, these lines on terga III-VII each with a dark blotch behind them medially; legs dull brownish yellow, darkest in coxae and femora; fore wings brown, slightly darker marginally and in anal lobe, pale in front of latter at base; antennae dull brownish gray, paler in apical part of II and base of III. Head 183, across eyes 133, just behind eyes 117, across cheeks 142, near base 132, across basal collar 135, across head-process 80; surface reticulate in and behind ocellar area, along cheeks, and broadly across base, striate and reticulate medially; postocular setae 73, dilated at tip, 108 apart, 26 from eyes; eyes 54, width 38, interval 57; mouth-cone normal, 73. Antennal segments: I 40 (40), II 53 (33), III 61 (33), IV 57 (32), V 65 (27), VI 56 (26), VII 44 (21), VIII 43 (14), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 110, across coxae 252, pronotum with a few faint striae along posterior margin, remainder smooth; antero-marginal setae 20, close together, slender, pointed, antero-angulars 75, midlaterals 69, epimerals 82, postero-marginals 91, coxals 48, these major setae all dilated at tip; mesothorax 259 across anterior angles; metanotum with somewhat elevated pelta which is polygonally reticulate throughout; fore tarsi with a small tooth on inner surface. Abdomen 361 at segment III; median tergite of I reticulate anteriorly; remainder of dorsal surface nearly smooth; tube 144, across base 70, at tip 38, terminal setae 86; most setae broadened apically, those on IX pointed, 150-152.

BRAZIL: Nova Teutonia, S.C., April 1954, Fritz Plaumann, 4 ♀♀ (including holotype), under fallen leaves.

***Eurythrips xanthozonus*, sp. nov.**

Resembling *cinctus* in the normal size of pronotal setae, presence of one sense-cone on outer surface of third antennal segment and one on inner surface of fourth segment, and in the brown body with its pale yellowish second and third abdominal segments; but with head only 1.1 times as long as wide and segment VI of antennae nearly twice as long as wide.

♀ (macropterous).—Length about 1.6 mm. (partially distended, 2.0 mm.). Color brown or light blackish brown, head darker than prothorax, abdomen pale yellow in segment II, III yellow but darkened medially and posteriorly, IV-IX successively darker, tube blackish brown, paler in apical half; legs brownish yellow, fore coxae brown, fore femora shaded with brown in about basal half, other femora and all tibiae very lightly

shaded with brown, the tibiae basally; fore wings brown in anal lobe, light brownish yellow in about basal fourth, nearly clear beyond; antennae blackish brown throughout, with pedicel of III yellow. Head 185, across eyes 148, just behind eyes 145, across cheeks 167, near base 164, across head-process 90; surface almost perfectly smooth, with a few faint striae along cheeks; setae normal, postoculars 66, pointed, interval 130, distance from eyes 18; eyes 55, width 38, interval 72; mouth-cone normal, 90. Antennal segments: I 42 (44), II 57 (36), III 61 (37), IV 59 (37), V 62 (34), VI 60 (30), VII 56 (27), VIII 43 (18), sense-cones on III 1 (1), IV 1 (2), all setae pointed. Prothorax 134, across coxae 280, pronotum smooth, without striae along posterior margin; antero-marginal setae vestigial, antero-angulars 48, midlaterals 70, epimerals 100, postero-marginals 100, coxals 64, all of them finely pointed; mesothorax 284 across anterior angles; metanotum without differentiated pelta, smooth; fore tarsi toothed on inner surface. Abdomen 336 at segment IV, nearly smooth except for median tergite of I which is reticulated anteriorly and at sides; tube 143, across base 80, at tip 40, terminal setae 120; setae on IX finely pointed, I 199, II 207.

BRAZIL: Belém, Pará, August 2, 1951, J.D.H., 1 ♀ (holotype) from grass (some partially dead).

Eurythrips occipitalis, sp. nov.

Easily distinguished by the large, knobbed, occipital setae, which are almost equal to the postoculars; by the bright yellow color of antennal segments III-VI; and by the largely yellow pterothorax and fourth to seventh abdominal segments.

♀ (brachypterous).—Length about 1.6 mm. (fully distended, 2.0 mm.). Color brown or blackish brown, pterothorax and abdominal segments IV-VII yellow, III paler than II and VIII pale at base, tube pale at base and in about apical half; legs brown except for the yellowish tarsi, trochanters, knees, and mid and hind coxae; antennae brown in segment I and base of II, yellow beyond. Head 228, across eyes 146 (142), just behind eyes 126 (123), across cheeks 168 (164), near base 150, across basal collar 151, across head-process 86; surface rugose-reticulate in ocellar area, lightly reticulate across base, cheeks with short elevated angulate lines of sculpture, remainder smooth; postocular setae 70, dilated at tip, interval 100, distance from eyes 19; occipital setae 47, similar to postoculars, interval 80, distance behind postoculars about 29; eyes 53 (53), width 41 (39), interval 65 (65). Antennal segments: I 40 (41), II 57 (32), III 95 (31), IV 86 (29), V 86 (26), VI 69 (23), VII 57 (21), VIII 50 (13); sense-cones on III and IV 1 (2); all setae pointed. Prothorax 147, across coxae 330; pronotum with a few faint striae along posterior margin, remainder smooth; antero-marginal setae minute, antero-angulars 86, midlaterals 72, epimerals 72, postero-marginals 75, coxals 31, all of these nearly straight and dilated at tip; mesothorax 272 across anterior angles; metanotum with pelta reticulate throughout; fore tarsi with a minute tooth on inner surface. Abdomen 395 at segment III; median tergite of I somewhat narrowed anteriorly, lightly reticulate; remainder of dorsal surface nearly smooth; tube 139, across base 80, at tip 40, sides straight, terminal setae 107; most setae dilated apically, I on IX 130 and slightly dilated, II 143 and dull.

BRAZIL: Nova Teutonia, S.C., July 1955 (1 ♀) and August 1955 (1 ♀, holotype), Fritz Plaumann, under fallen leaves.

Eurythrips cruralis, sp. nov.

Very different from the other species of the genus which have the normal complement of pronotal setae, two sense-cones on outer surface of antennal segment III, and yellow head, by the yellow femora and brown tibiae, yellow first antennal segment, yellow basal third of otherwise brown tube, and the smooth metanotum without differentiated pelta.

♀ (brachypterous).—Length about 1.7 mm. (fully distended, 2.1 mm.). Color golden yellow, prothorax shaded with brown, pterothorax darkened along sides and in front, abdomen somewhat shaded laterally, tube bright yellow in about basal third but shading to brown in remainder; femora about concolorous with body though slightly shaded, tibiae brown or blackish but narrowly yellow at base, tarsi yellow; antennae bright yellow in segment I, yellowish brown in II, remainder dark blackish brown excepting only the yellow pedicel of III. Head 214, across eyes 152, just behind eyes 133, across cheeks 161, near base 157, at basal collar 160, across head-process 90; surface somewhat reticulate in ocellar area, lightly reticulate across base, cheeks transversely striate, remainder smooth; setae normal, postoculars 56, dilated at tip, interval 91, distance from eyes 14; eyes 53, width 40, interval 72; mouth-cone normal, 119. Antennal segments: I 43 (42), II 56 (37), III 73 (34), IV 64 (32), V 67 (30), VI 60 (28), VII 50 (26), VIII 48 (16), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 168 (154), across coxae 336 (301), pronotum with a few faint striae along posterior margin; antero-marginal setae minute, antero-angulars 67, midlaterals 73, epimerals 92, postero-marginals 82, coxals 44, all of these dilated at tip; mesothorax 281 (260) across anterior angles; metanotum smooth, without differentiated pelta; fore tarsi with the usual recurved tooth on inner surface. Abdomen 447 (384) at segment III or IV, nearly smooth, most setae dilated; tube 140, across base 87, at tip 45; terminal setae 111; setae I and II on IX 153-156, both pointed.

BRAZIL: Nova Teutonia, S.C., August 1952 (holotype) and August 1955, Fritz Plaumann, 2 ♀ ♀ from fallen leaves.

Eurythrips elongatus, sp. nov.

The long head (nearly 1.9 times the width across eyes) and the yellow third to fifth antennal segments distinguish this species from all others.

♀ (brachypterous).—Length about 1.6 mm. (fully distended, 2.1 mm.). Color yellow, head brownish and darker than prothorax, sides of pterothorax and junction of mesonotum and metanotum darkened, abdomen darker apically and becoming brown or nearly so in last two or three segments, tube brown but narrowly pale across base and again pale in more than apical one-half; legs yellow; wing-pads brown; antennae brown in segments I and II, the latter nearly yellow medially in apical half, III-V yellow, VI-VIII successively darker, VI yellow in pedicel, yellowish beyond. Head 241, across eyes 129, just behind eyes 109, across cheeks 150, near base 137, at basal collar 142, across head-process 88; surface reticulate in ocellar area and more lightly so across base, cheeks transversely striate, remainder smooth; setae normal, postoculars 60, slightly dilated at tip, interval 82, distance from eyes 26; eyes 46, width

about 31, interval about 67; mouth-cone normal, 105. Antennal segments: I 48 (47), II 57 (34), III 77 (33), IV 73 (31), V 71 (28), VI 62 (27), VII 46 (24), VIII 44 (16), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 140, across coxae 298, pronotum with a few faint striae along posterior margin; antero-marginal setae minute, antero-angulars 52, midlaterals 72, epimerals 70, postero-marginals 80, coxals 33, all of these slightly dilated at tip; mesothorax 252 across anterior angles; metanotal pelta only partially differentiated by a few reticles laterad and caudad of the two major setae, metanotum otherwise smooth; fore tarsi with a very small tooth on inner surface. Abdomen 333 at segment IV, nearly smooth excepting for the polygonally reticulate median tergite of segment I, most setae dilated; tube 133, across base 81, at tip 42, terminal setae 94; seta I on IX 158, II 148, both finely pointed.

♂ (brachypterous).—Like ♀ in color and structure; sternum VIII without glandular area, but with about 22 setae across middle.

BRAZIL: Nova Teutonia, S.C., July 1953 (1 ♀, holotype) and February 1954 (1 ♀ and 1 ♂, the latter the allotype), Fritz Plaumann, under fallen leaves.

Eurythrips nigriceps, sp. nov.

Resembling *citricollis* in having a dark brown head which contrasts strongly with a yellow prothorax, but differing from that species in that the major setae of the head and body are slightly dilated apically, cheeks rather heavily sculptured and distinctly roughened as seen under low magnification, metanotum smooth medially but with a few striae external to the two major setae, and the median tergite of segment I of abdomen broad, with its anterior portion broader than long.

♀ (brachypterous).—Length about 1.2 mm. (fully distended, 1.6 mm.). Color dull yellow, with dark brown head (yellowish in ocellar area and across base) and brown tube (yellowish across base and in about apical one-half), lightly shaded along sides of pterothorax and across metathorax, as well as in about posterior third of abdominal terga II-VIII, tergum IX largely brown; legs yellow; antennae yellowish brown in first two segments, uniform blackish brown beyond excepting yellow extreme base of III. Head 178, across eyes 116, just behind eyes 108, across cheeks 136, near base 118, at basal collar 120, across head-process 73; surface roughly reticulate in ocellar area, lightly reticulate across base, smooth medially, the cheeks coarsely transverse sculptured; setae normal, postoculars 52, dilated at tip, interval 93, distance from eyes 14; eyes 34, width 33, interval 50; mouth-cone normal, 64. Antennal segments: I 36 (37), II 47 (31), III 47 (32), IV 46 (29), V 47 (26), VI 46 (25), VII 38 (22), VIII 37 (15), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 112, across coxae 238, pronotum with a few striae along posterior margin; antero-marginal setae minute, antero-angulars 50, midlaterals 55, epimerals 63, postero-marginals 66, coxals 33, all of these dilated at tip; mesothorax 213 across anterior angles; metanotum without differentiated pelta, nearly smooth; fore tarsi with the usual recurved tooth on inner surface. Abdomen 253 at segment III, nearly smooth, most setae dilated; tube 110, across base 69, at tip 33, terminal setae 75; seta I on IX 118, II 127, both pointed.

BRAZIL: Nova Teutonia, S.C., August 1955, Fritz Plaumann, 1 ♀ (holotype) from fallen leaves.

Eurythrips hemimeres, sp. nov.

Readily known from the other species of the genus which have the normal complement of pronotal setae, two sense-cones on outer surface of antennal segment III, yellow head, prothorax, and legs, lightly polygonally reticulate pelta of metanotum, dark brown tube, and brown basal antennal segments, by the dark brown second abdominal segment (which is much darker than metathorax or abdominal segment III), tooth at anterior end of cheeks not fully attaining eyes, tergum II of abdomen not reticulate medially at base, and glandular area of ♂ occupying most of sternum VIII.

♀, *forma macroptera*.—Length about 1.5 mm. (fully distended, 1.9 mm.). Color golden yellow, with second abdominal segment dark brown, tube dark brown but narrowly paler across base and in apical half or more; shaded lightly with brown in fore coxae, in basal half of fore femora, along sides of mesothorax, at sides of metanotal sclerite, and at sides of abdominal segments, especially III, VIII, and IX; terga III-VI of abdomen with a narrow median dark dash just behind antecostal line; antennae with segments I-III yellowish brown, paler than the blackish brown IV-VIII, pedicel of III yellow, its tip shaded; fore wings brown, with a median dark streak and dark edges, pale at extreme base except for the dark anal lobe. Head 214 long, 138 across eyes, 117 just behind eyes, 145 across cheeks, 132 near base, 135 across collar, 80 across head-process; surface roughly reticulate in ocellar area and along cheeks, lightly reticulate across base, remainder smooth; setae normal, postoculars 46, slightly dilated, interval 84, distance from eyes 18; eyes 54, width 39, interval 60; mouth-cone normal, 64. Antennal segments: I 43 (40), II 54 (33), III 69 (29), IV 60 (29), V 61 (27), VI 55 (25), VII 45 (22), VIII 45 (14), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 137, 266 across coxae, pronotum with a few striae along posterior margin; antero-marginal setae minute, antero-angulars 46, midlaterals 42, epimerals 59, postero-marginals 57, coxals 36, all of these dilated at tip; mesothorax 263 across anterior angles; metanotal pelta rounded at sides and posteriorly, polygonally reticulate; fore wings normal, 693; fore tarsi with the usual recurved tooth on inner surface. Abdomen 318 at segment IV, nearly smooth, most setae dilated; tube 133, across base 77, at tip 35, terminal setae 98; setae I and II on IX 100-106, both slightly dilated apically.

♀, *forma brachyptera*.—Color and structure essentially as in long-winged form.

♂ (brachypterous).—Color as in ♀; prothorax and fore legs heavier; glandular area occupying most of sternum VIII.

BRAZIL: Nova Teutonia, S. C., August 1952 to October 1955, Fritz Plaumann, 117 ♀♀ and 38 ♂♂; holotype (macropterous ♀), morphotype (brachypterous ♀), and allotype (♂) taken in April 1954; all from fallen leaves.

Chthonothrips, gen. nov.

(*chthon*, earth; *thrips*—in allusion to the habitat)

Allied to *Eurythrips* Hinds, but differing in the more massive and more heavily sclerotized body and appendages, the presence of pores on the antecostal lines and of a pair of large pores on most terga near middle, and the presence of a strong tooth near middle of fore tarsi in both

sexes. Head incised behind the small and coarsely-faceted eyes, surface almost perfectly smooth; mouth-cone large and heavy, not narrowed at base, semicircularly rounded at tip. Antennae heavily sclerotized, 8-segmented, last segment narrowed at base, all setae pointed, sense-cones not long, one on either side of segments III-VI. Pronotum smooth, not fused with epimera, anteromarginal setae minute, others moderate and dilated at tip; meso- and metanota smooth; legs short and stout, fore tarsi strongly toothed near base. Abdomen not broader than thorax; tube nearly equal in length to head, almost smooth, slightly narrowed at tip, sides thickened.

Type species: *Chthonothrips nigrocinctus*, sp. nov.

***Chthonothrips nigrocinctus*, sp. nov.**

♀ (apterous).—Length about 2.2 mm. (fully distended, 2.7 mm.). Color of body and appendages golden yellow, with abdominal segment II brown and mesothorax shaded with brown; tube brownish orange, pale at base and apex. Head 301 μ long, 178 across eyes, just behind eyes 161, across cheeks 195, near base 181, across basal collar 183, across head-process 118, this last 16-17 long at sides; surface with a few very indistinct reticles at sides of base, otherwise smooth; postocular setae slightly dilated apically, 77 long, 147 apart, 33 from eyes, other cephalic setae minute; eyes with about 5 lateral facets; mouth-cone 113. Antennal segments: I 62 (57), II 73 (45), III 81 (46), IV 61 (44), V 66 (41), VI 63 (38), VII 62 (31), VIII 63 (22); sense-cones on III-VI 1 (1). Prothorax about 200 long, 399 across coxae, smooth; antero-angular setae 33, midlaterals 54, epimerals 71, postero-marginals 69, coxals 51, all slightly dilated at tip; mesothorax 336 across anterior angles; metanotum slightly roughened in anterior angles. Abdomen 391 at segments IV-V; median tergite of segment I subtriangular, smooth; II faintly reticulate on either side of median line, other terga nearly smooth; tube 266, across basal collar 114, at apex 42, sides straight except for a slight apical narrowing; terminal setae 196; seta I on IX 280, II 252, both pointed.

***Chortothrips*, gen. nov.**

(*chortos*, grass; *thrips*—in allusion to the habitat)

Allied to *Eurythrips* Hinds, but differing in the more massive and more heavily sclerotized body and appendages, the presence of pores on the antecostal lines and of a pair of large pores on most terga near middle,

♂ (apterous).—Very similar to female in all respects; fore legs often swollen and with tarsal tooth stronger; glandular area on sternum VIII occupying about middle half, its ends emarginate.

BRAZIL: Nova Teutonia, S.C., Fritz Plaumann, November, 1954, and July, August, September, and October, 1955, 14 ♀♀ (holotype taken in September) and 9 ♂♂ (allotype taken in August), from fallen leaves. a tooth near base of fore tarsi in both sexes, the union of the last two antennal segments into a single unit, the short heavily thickened tube, and the presence of well-developed antero-marginal pronotal setae. Head long, incised behind the small and coarsely-faceted eyes, surface partially and lightly striate; mouth-cone large and heavy, not narrowed at base, rounded at tip. Antennae heavily sclerotized, 8-segmented but with the last two segments compactly united, all setae pointed, sense-cones not long.

Pronotum smooth, not fused with epimera, antero-marginal setae as large as anteroangulars, all dilated at tip; legs short and stout. Tube shorter than head, lightly reticulate, strongly narrowed to tip, sides much thickened.

Type species: *Eurythrips valens* Hood.

Plemmelothrips, gen. nov.

(*plemmeles*, discordant, dissonant; *thrips*—in allusion to the lack of large antero-angular pronotal setae)

Allied to *Terthrothrips*, but with the antennae stouter, pronotum not thickened along anterior margin and its anterior angles not prominent or produced, its antero-angular setae reduced, head short, broad, and somewhat flattened, with eyes less protruding and farther apart, and ocelli larger, tergite I of first abdominal segment triangular. Body moderately stout, not reticulated. Head notched behind eyes, moderately flattened, with long postocular setae; eyes protruding, more than one-half as long as cheeks, much narrower than their interval; ocelli large, the posterior pair behind middle of eyes, ocellar area not elevated; mouth-cone normal to group; antennae 8-segmented, moderately stout, last segment pedicellate; sense-cones normal, segment III 1 (2), IV 2 (2); all setae pointed. Prothorax with convex lateral margins, notum fused with epimeron; antero-marginal setae vestigial, antero-angulars reduced, others long and truncate at tip; pelta of metathorax weakly differentiated; fore wings nearly straight, without accessory setae, subbasal setae long; legs with numerous small setae, fore tarsi armed. Abdomen moderately heavy, nearly free of sculpture, setae long; median tergite of segment I broadly triangular; tube long, heavy, not sculptured, not thickened.

Type species: *Plemmelothrips defectus*, sp. nov.

Plemmelothrips defectus, sp. nov.

♀, *forma macroptera*.—Length about 1.7 mm. (nearly fully distended, 2.1 mm.). Color nearly uniform chestnut brown, with pale brown fore wings and pale dull-yellow legs, femora lightly shaded with brown; antennae with segments I and II about concolorous with head and darker than the following ones, III and IV pale to first whorl of setae, their apical portions and V-VIII dark brownish gray. Head 213, across eyes 169, just behind eyes 154, across cheeks 169, near base 151, across basal collar 158, across head-process 93, its surface with close anastomosing cross-lines at base medially, cheeks with raised lines of sculpture and thus serrate; postocular setae 67, somewhat curved, slightly dilated at tip, interval 116, distance from eyes 16; eyes 74, width 47, interval 77; mouth-cone 90. Antennal segments: I 47 (45), II 58 (32), III 83 (32), IV 86 (32), V 85 (27), VI 72 (24), VII 57 (22), VIII 68 (16). Prothorax 163, across coxae 293, pronotum smooth except for a few faint striae posteriorly; antero-marginal and antero-angular setae 16-35, slender and pointed, the others much stronger and diagonally truncate at tip, midlaterals 67-84, epimerals 89-94, postero-marginals 100, coxals about 39; mesothorax 295 across anterior angles; metanotal pelta not sharply delimited, lightly reticulate laterally and posteriorly; fore tarsi with a small recurved tooth on inner surface; fore wings 868. Abdomen 385 at segment III, median tergite of I smooth, most of following terga faintly subreticulate at sides and faintly cross-striate immediately behind antecostal line; tube 199, across base 85, at tip 43, sides straight, surface

smooth, terminal setae 110; other setae long, mostly somewhat dilated at tip, I on IX 203 and blunt, II 224 and pointed.

♀ *forma brachyptera*.—Like long-winged form in color and structure, but with smaller eyes (54 long, 32 wide, 86 apart).

♂ (brachypterous).—Like ♀ in color and structure; glandular area on sternum VIII of abdomen occupying about middle one-half of the length of segment and most of its width, emarginate laterally.

BRAZIL: Nova Teutonia, S.C., May 1953 to October 1955, Fritz Plaumann, 4 macropterous ♀♀ (including holotype taken in February 1954), 15 brachypterous ♀♀ (including morphotype taken in October 1955), and 1 ♂ (allotype, taken with morphotype), under fallen leaves.

***Terthrothrips bucculentus*, sp. nov.**

Readily known by the yellow second abdominal segment, the stout and almost wholly brown antennae, and the very convex cheeks.

♀ *forma macroptera*.—Length about 1.3 mm. (fully distended, 1.74 mm.). Color brown (not blackish brown), darkest in pterothorax and along sides and front of head, the second abdominal segment pale yellow; abdomen darkened in about fourth and fifth segments (especially laterally) and becoming more yellowish in seventh and eighth, segments III-VIII with a small median gray spot on antecostal line, the tube brown but paler basally and in about apical half; legs yellow, little shaded with brown; fore wings brown, with a darker median streak; antennae blackish brown in most of segments I and II, brown beyond but paler and more grayish in about last three segments, III yellowish to near first whorl of setae, IV and V paler just beyond an indistinct dark basal ring. Head 195, across eyes 140, just behind eyes 117, across cheeks 143, near base 120, across basal collar 126, across head-process 73, the cheeks, roundly convex and curving nearly evenly to eyes and toward base; surface reticulate across base, with elevated cross-lines along cheeks (the latter thus distinctly serrate), reticulate in ocellar area, and with short cross-lines in median area from ocelli to basal reticulation, finely reticulostriate ventrally and without pustules; postocular setae 58, straight, roundly dilated at tip, interval 88, distance from eyes 17; eyes about 61, 42 wide 57 apart. Antennal segments: I 42 (36), II 53 (29), III 74 (27), IV 65 (25), V 59 (24), VI 51 (23), VII 43 (20), VIII 46 (13); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 99, across coxae 225; pronotum smooth except for a few faint striae along posterior margin; anterior margin and fore angles thickened; antero-marginal setae vestigial, antero-angulars 50, midlaterals 60, epimerals 67, postero-marginals 71, coxals 45, all of these last with tips dilated and divided; mesothorax 227 across anterior angles; pelta of metathorax well differentiated, reticulate, prolonged posteriorly by a line of reticles; fore tibiae serrate along inner surface, fore tarsi with the usual recurved tooth; fore wings 651. Abdomen 294 at segment IV; median tergite of I capstan-shaped, reticulate; most of following terga with faintly mucronate cross striae at sides; tube 118, across base 66, at tip 33, sides straight, surface smooth, terminal setae 67; other setae long, mostly dilated at tip, I and II on IX 100-104, both of these knobbed.

♀, *forma microptera*.—Like long-winged form in all respects.

♀, *forma brachyptera*.—Like long-winged form in all respects, eyes not smaller.

♂ (brachypterous).—Like female in color and structure; fore legs enlarged in heterogonic major forms; glandular area on sternum VIII occupying most of surface.

BRAZIL: Nova Teutonia, S.C., May 1953 to October 1955, Fritz Plaumann, 114 ♀♀ (including holotype, morphotype of micropterous form, and morphotype of brachypterous form taken in April 1954) and 24 ♂♂ (including allotype taken with holotype and morphotypes), under fallen leaves.

***Terthrothrips peltatus*, sp. nov.**

Readily known by the uniform dark blackish brown head, thorax, and abdomen, yellow legs, and the reticulate metanotal pelta, which lacks a posterior prolongation.

♀, *forma macroptera*.—Length about 1.9 mm. (fully distended, 2.5 mm.). Color uniform dark blackish brown, with yellow legs; fore wings light brown, paler at base in front of anal lobe, darker marginally and with a still darker post-median streak at middle; antennae with segments I and II concolorous with head, III golden yellow, IV-VI with a dark basal ring and paler just beyond, remainder of antennae brown, more yellowish in IV, especially at its apex. Head 270, across eyes 168, just behind eyes 137, across cheeks 168, near base 149, across basal collar 156, across head-process 95, cheeks evenly convex except for a more or less evident tooth behind eyes: surface with a few large reticles medially in front of occipital line, with elevated interrupted cross-lines or rugae along cheeks (the latter thus distinctly serrate), pustulate along sides ventrally, ocellar area with a few indistinct rugae; postocular setae 83, straight, dilated apically, interval 99, distance from eyes 25; eyes about 78, width 46, interval 76. Antennal segments: I 55 (47), II 69 (34), III 113 (31), IV 114 (30), V 114 (29), VI 83 (27), VII 69 (21), VIII 69 (14); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 160, across coxae 301; pronotum smooth except for a few striae along posterior margin and a few slight wrinkles near anterior angles; fore margin thickened; antero-marginal setae vestigial, antero-angulars 79, midlaterals 100, epimerals 101, postero-marginals 120, coxals 72, all of these last with tips dilated; mesothorax 307 across anterior angles; pelta of metathorax well differentiated, reticulate, not prolonged posteriorly; fore tibiae serrate along inner surface, fore tarsi with strong recurved tooth; fore wings 864. Abdomen 416 at segment IV; median tergite of I capstan-shaped, with a few indistinct reticles; most of following terga with faintly mucronate cross-striae at sides; tube 154, across base 87, at tip 45, sides slightly concave near base, otherwise straight, surface smooth, terminal setae 106; other setae long, mostly dilated at tip, I on IX 136, II 153, both dilated apically.

♀, *forma microptera*.—Not significantly different from long-winged form.

♀, *forma brachyptera*.—Not significantly different from long-winged form.

♂ (brachypterous).—Like ♀ in color and structure; pronotum and fore legs enlarged in heterogonic major forms; glandular area on sternum VIII occupying most of surface.

BRAZIL: Nova Teutonia, S. C., February 1953 to September 1955, Fritz Plaumann, 80 ♀♀ (including holotype, morphotype of micropterous

form, and morphotype of brachypterous form taken in October 1954) and 16 ♂♂ (including allotype taken with holotype and morphotypes), under fallen leaves.

***Terthrothrips viduus*, sp. nov.**

Like *carens* and *bicinctus*, only, in having small antero-angular pronotal setae; but unlike former in having tube largely yellow (instead of blackish brown) and metathoracic pelta not sculptured between the two major setae; unlike latter species in lacking the two bright yellow bands across body.

♀ (macropterous).—Length about 1.3 mm. (fully distended, 1.7 mm.). Color brown, head darkest and blackish brown; abdominal segments II, III, basal half of IV, and all of VI-VIII darkened; tube yellow or yellowish, tipped with gray, sometimes lightly shaded; metathorax yellowish posteriorly; legs yellow, femora shaded with brown; fore wings light brown, paler basally, darkened marginally, medially, and in anal lobe; antennae gray-brown, segments I and II darkest (II black in pedicel), III pale yellowish in pedicel, IV-VI pale just beyond an ill-defined narrow basal dark ring. Head 172, across eyes 132, just behind eyes 116, across cheeks 133, near base 128, across basal collar 130, across head-process 72; dorsal surface lightly reticulate across base and along sides, nearly smooth in ocellar area and medially, cheeks not conspicuously serrate; postocular setae 65, straight, dilated at tip, interval 98, distance from eyes 12; eyes 62, protruding, width 41, interval 53. Antennal segments: I 35 (37), II 50 (28), III 63 (26), IV 72 (28), V 76 (24), VI 60 (21), VII 43 (18), VIII 47 (12); sense-cones on III 1 (2), IV 2 (2); all setae pointed. Prothorax 102, across coxae 235; pronotum smooth, without the usual faint striae along posterior margin; fore margin and anterior angles slightly strengthened, the latter not prominent; antero-marginal and antero-angular setae vestigial (about 7), midlaterals 80, epimerals 89, postero-marginals 101, coxals 54, all of these last nearly straight and with dilated tips; mesothorax 238 across anterior angles; metathoracic pelta well differentiated, not prolonged, reticulate at sides and posteriorly, smooth between the two major setae; legs normal, fore tibiae serrate along inner surface, fore tarsi with usual long recurved tooth; fore wings 633. Abdomen 281 at segment III; median tergite of I capstan-shaped, with a few obsolete reticles; most of following terga nearly smooth, but with a few short mucronate cross-lines at sides; tube 116, across base 58, at tip 33, sides slightly rounded or angulate at basal pores, straight beyond, surface in basal two-thirds with scale-like pattern of fine lines, terminal setae 72; other setae long, mostly knobbed, I on IX 112 and knobbed, II 142 and dull.

♂ (macropterous).—Like female in color and general structure; abdominal segment VIII somewhat paler than those adjoining, its glandular area occupying most of sternum.

BRAZIL: Nova Teutonia, S.C., April, August, and September, 1954, Fritz Plaumann, 9 ♀♀ (including holotype taken in September) and 1 ♂ (allotype, taken in August), under fallen leaves.

***Terthrothrips carens*, sp. nov.**

For separation from other species, see description of *viduus*, above.

♀ (macropterous).—Length about 1.3 mm. (fully distended, 1.8 mm.). Color chestnut brown, darker in pterothorax, yellowish in head except

along sides; legs yellow; fore wings light brown, paler basally, darker marginally, medially, and in anal lobe; antennae largely blackish brown in segments I and II, dark gray beyond, III-VI pale to first whorl of setae except for an indistinct narrow dark ring at base of IV-VI. Head 193, across eyes 144; just behind eyes 125, across cheeks 143, near base 129, across basal collar 131, across head-process 75; dorsal surface lightly reticulate across base and along sides, smooth in ocellar area and medially, cheeks not conspicuously serrate; postocular setae 69, straight, dilated at tip, interval 102, distance from eyes 16; eyes 67, rather strongly protruding, width 42, interval 61. Antennal segments: I 39 (37), II 53 (29), III 76 (25), IV 74 (26), V 77 (23), VI 63 (21), VII 43 (19), VIII 53 (13); sense-cones on III 1 (2), IV 2 (2); all setae pointed. Prothorax 122, across coxae 248; pronotum smooth, with a few faint striae along posterior margin; fore margin not strengthened, anterior angles with a slight notch marking off a small lobe at a lower level, this lobe bearing the antero-angular setae; antero-marginal setae vestigial (about 20), antero-angulars 20-32, both slender and pointed; midlaterals 79, epimerals 82, postero-marginals 89, coxals 46, all nearly straight and with dilated tips; mesothorax 218 across anterior angles; metathoracic pelta well differentiated, with a short overhanging loop at sides, not prolonged posteriorly, lightly reticulate between the major setae, clearly reticulate posteriorly; legs normal, fore tibiae strongly serrate along inner surface, fore tarsi with the usual recurved tooth; fore wings 633. Abdomen 290 at segment III; median tergite of I capstan-shaped, distinctly reticulate; most of the following terga nearly smooth, but with a few mucronate lines at sides; tube 123, across base 64, at tip 33, sides straight, surface smooth, terminal setae 58; other setae long, mostly knobbed, I on IZ 123 and knobbed, II 127 and pointed.

♂ (macropterous).—Like female in color and general structure; prothorax and fore legs often enlarged; abdominal segment VIII generally somewhat paler than those adjoining, its glandular area occupying most of sternum.

BRAZIL: Nova Teutonia, S. C., February and April 1954, 2 ♀♀ (including holotype taken in April) and 4 ♂♂ (including allotype taken with holotype); Erechim, Rio Grande do Sul, August 1956, 1 ♀ and 2 ♂♂. All specimens were taken by Mr. Fritz Plaumann, under fallen leaves.

***Terthrothrips brunneus*, sp. nov.**

Closely related to *fuscatus*, but larger, with elevated portion of metanotal pelta semicircular, anterior angles of pronotum scarcely produced, and antennal segments IV and V without a pale subbasal ring.

♀ (macropterous).—Length about 1.9 mm. (fully distended, 2.3 mm.). Color nearly uniform chestnut brown, tube paler across base and in apical half or more; legs yellowish brown, with ends of femora and of middle and hind tibiae paler, tarsi yellow, fore tibiae yellowish only at base; fore wings light brown, slightly darkened marginally beyond middle and with a median dark streak in apical two-thirds, nearly colorless for a short distance near posterior margin beyond anal lobe, this last not darkened; antennae blackish brown in segments I and II, yellowish brown beyond, was basal seventh of III yellow and somewhat darkly shaded from thence to first whorl of setae, pedicels of IV and V pale. Head 263, across eyes 156, just behind eyes 126, across cheeks 159, near base 148, across

basal collar 155, across head-process 93, cheeks roundly convex, without tooth behind eyes, strongly serrate; surface cross-striate just in front of occipital line, with elevated interrupted cross-lines or rugae along cheeks, with a few pustules along sides ventrally, ocellar area and median line of dorsum with a few rugae; postocular setae 70, nearly straight, dilated apically, interval 94, distance from eyes 13; eyes about 74. Antennal segments: I 51 (47), II 63 (31), III 101 (29), IV 96 (27), V 91 (25), VI 76 (23), VII 57 (20), VIII 57 (13); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 171, across coxae 315; pronotum smooth except for a few striae along posterior margin; fore margin and anterior angles thickened; antero-marginal setae vestigial, anteroangulars 75, midlaterals 76, epimerals 85, postero-marginals 77, coxals 60, all of the major setae with tips dilated; mesothorax 287 across anterior angles; pelta of metathorax well differentiated, reticulate, prolonged posteriorly nearly to margin of sclerite, its elevated portion semi-circular and with sides overhanging; fore tibiae strongly serrate along inner surface, fore tarsi with a strong recurved tooth; fore wings 731. Abdomen 413 at segment III; median tergite of I narrowed anteriorly, scarcely capstan-shaped, surface largely lightly reticulate; most of following terga with faintly mucronate cross-striae at sides; tube 160, across base 80, at tip 39, sides slightly concave near base, otherwise straight, surface smooth, terminal setae 94; other setae long, mostly dilated at tip, I and II on IX 145, dilated apically.

BRAZIL: Nova Teutonia, S.C., April 1954, Fritz Plaumann, 5 ♀ ♀ (including holotype), under fallen leaves.

***Terthrothrips bullifer*, sp. nov.**

A large species, with long head, nearly straight cheeks, and bent fore femora, unique in having a nearly spherical, bubble-like pustule near base of inner surface of fore femora.

♀ (macropterous).—Length about 2.2 mm. (fully distended, 2.7 mm.). Color yellowish brown, somewhat darker in head and along sides of pterothorax, abdomen clouded with brown along sides of most terga, along antecostal line, and posteriorly; tube blackish brown at middle, pale across base and in about apical third; legs dull yellow; fore wings light brown, darker marginally and medially; antennae blackish brown in most of segments I and II, III-VIII brown, with about basal tenth of III yellow and yellowish also in pedicels of IV and V. Head 311, across eyes 185, just behind eyes 146, across cheeks 174, near base 160, across basal collar 167, across head-process 103, cheeks nearly parallel (only slightly convex), nearly semicircularly in-cut to eyes from a sharp tooth, strongly serrate; surface smooth from median ocellus to a few faint striae in front of occipital line, with short elevated rugae and prominent though small tubercles along cheeks, this sculpture continued for a short distance onto ventral surface; postocular setae 81, straight, dilated at tip, interval 99, distance from eyes 25; eyes 90, protruding and very prominent, width 54, interval 81. Antennal segments: I 56 (50), II 70 (34), III 123 (33), IV 119 (30), V 114 (26), VI 83 (23), VII 72 (22), VIII 66 (13); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax long (223), across coxae 370; pronotum almost perfectly smooth; fore margin and anterior angles thickened; antero-marginal setae vestigial, anteroangulars 75, midlaterals 95, epimerals 110, postero-marginals 107, coxals

70, all of these last straight and with dilated tips; mesothorax 336 across anterior angles; pelta of metathorax well differentiated, reticulate, not prolonged posteriorly, its elevated portion with sides curved and overhanging; fore femora strongly bent at base, with a prominent rounded tubercle on inner surface close to trochanter, just basal to the bend; fore tibiae curved, serrate along inner surface; fore tarsi with a strong recurved tooth; fore wings 1010. Abdomen 427 at segment IV; median tergite of I narrowed anteriorly but not capstan-shaped, surface lightly reticulate around edges; most of following terga with a few faint striae at sides; tube 182, across base 84, at tip 44, sides slightly concave near base, otherwise straight, surface smooth, terminal setae 112; other setae long, mostly dilated at tip, I on IX 150 and dilated at tip, II 157 and nearly pointed.

♂ *forma macroptera*.—Like female in color and general structure; glandular area on sternum VIII of abdomen occupying most of segment.

♂, *forma brachyptera*.—Like long-winged male, except in the somewhat smaller eyes and the short-wing-pads which extend about half way to abdomen.

BRAZIL: Nova Teutonia, S. C., November 1952 (1 ♂, brachypterous, morphotype), February 1953 (1 ♀), May 1953 (1 ♀ and 1 ♂, both macropterous; holotype and allotype, respectively), and November 1954 (1 ♂), all taken by Mr. Fritz Plaumann, under fallen leaves.

***Terthrothrips irretitus*, sp. nov.**

Recognizable at once by the yellow antennae, completely reticulated head, and large size.

♀ (macropterous).—Length about 1.8 mm. (fully distended, 2.4 mm.). Color pale yellowish brown, with abdominal segment II yellow; pterothorax darkest, front and sides of head shaded, abdominal segments III-V or VI darkened, tube blackish brown but pale across base and in about apical third; legs yellow, with femora shaded with brown except at ends; fore wings nearly uniform brown, slightly darker marginally and basally; antennae dark brown in most of segments I and II, lemon yellow in remaining segments or very lightly shaded with gray. Head 258, across eyes 162, just behind eyes 126, across cheeks 165, near base 151, across basal collar 157, across head-process 90, cheeks evenly convex, strongly serrate; surface polygonally reticulate throughout, the sculpture elevated along cheeks to form rugae and tubercles which are not continued onto ventral surface; postocular setae 77, straight, dilated at tip, interval 104, distance from eyes 26; eyes 73, protruding and very prominent, width 48, interval 67. Antennal segments: I 50 (45), II 63 (37), III 97 (33), IV 103 (33), V 103 (27), VI 86 (25), VII 66 (20), VIII 63 (13); sensecones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 133, across coxae 308; pronotum smooth except for the usual faint striae along posterior margin; fore margin not strengthened at middle, but with anterior angles thickened and forming a broad tooth; antero-marginal setae vestigial, antero-angulars 74, midlaterals 84, epimerals 72, postero-marginals 102, coxals 32, all of these last straight and with dilated tips; mesothorax 297 across anterior angles; pelta of metathorax well differentiated, nearly rectangular, narrowly prolonged posteriorly, reticulate; legs normal, fore tarsi with a small tooth on inner surface, fore tibiae

weakly serrate along inner surface; fore wings 843. Abdomen 377 at segment IV; median tergite of I capstan-shaped, lightly reticulate over most of surface; most of following terga with a few faint mucronate striae and reticles at sides; sternum VIII without the usual pair of small setae on posterior margin between the stout submedian pair; tube 178, across base 85, at tip 46, sides straight, surface smooth, terminal setae 97; other setae long, nearly all of them dilated at tip, I and II on IX both dilated, 161-170.

♂ (brachypterous).—Like female in color and general structure; fore legs enlarged, tarsal tooth long and strong; anterior angles of pronotum with a large and prominent tooth-like prolongation; wing-pads extending onto segment III of abdomen; glandular area on sternum VIII occupying most of the segment.

BRAZIL: Nova Teutonia, S. C., May 1953 to November 1954, Fritz Plaumann, 5 ♀♀ (including holotype taken in May 1953) and 1 ♂ (allotype, April 1954), under fallen leaves.

Terthrothrips luteolus, sp. nov.

The yellow antennae, yellow body with second abdominal segment abruptly blackish brown, rounded cheeks, and short coxal seta, should separate this species readily.

♀ (macropterous).—Length about 2 mm. (fully distended, 2.6 mm.). Color yellow, with abdominal segment II blackish brown, IX heavily shaded at sides; tube pale at base and in apical two-thirds, dark brown between; head darker than prothorax, heavily brown in ocellar area; fore coxae and all femora shaded with brown; fore wings light brown, somewhat darkened beyond base, marginally, and medially; antennae yellow, paler in apical segments, slightly darkened in I and II. Head 283, across eyes 172, just behind eyes 136, across cheeks 178, near base 149, across basal collar 157, across head-process 99; cheeks strongly and evenly convex, serrate; surface reticulate with dark lines in ocellar area, smooth at middle, lightly reticulate across base, sculpture of cheeks elevated to form rugae which are not continued onto ventral surface; postocular setae 86, straight, dilated at tip, interval 108, distance from eyes 30; eyes 84, protruding and prominent, width 50, interval 71. Antennal segments: I 52 (50), II 63 (39), III 110 (33), IV 113 (30), V 110 (28), VI 83 (25), VII 68 (23), VIII 69 (15); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 150, across coxae 343; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened; antero-marginal setae vestigial, antero-angulars 70, midlaterals 91, epimerals 84, postero-marginals 106, all of these last straight and with dilated tips, coxals very small (20) and dully pointed; mesothorax 342 across anterior angles; pelta of metathorax well developed, not overhanging laterally or posteriorly, pointed but not prolonged, reticulate throughout; legs normal, fore tibiae serrate along inner surface, fore tarsal tooth minute; fore wings 973. Abdomen 444 at segment III; median tergite of I narrowed in anterior portion but not capstan-shaped, its surface almost perfectly smooth; most of following terga with a few faint mucronate striae and reticles at sides; tube 197, across base 94, at tip 44, sides straight, surface smooth, basal pores dorsal, terminal setae 126; other setae long, mostly knobbed, I and II on IX scarcely pointed, 167 and 182, respectively.

BRAZIL: Nova Teutonia, S. C., 1954, Fritz Plaumann, 1 ♀ (holotype), under fallen leaves.

***Terthrothrips balteatus*, sp. nov.**

The only species of the genus with blackish brown body, yellow second abdominal segment, and yellow antennae.

♀, *forma macroptera*.—Length about 1.4 mm. (fully distended, 1.8 mm.). Color blackish brown, with abdominal segment II and anterior part of III lemon yellow; legs bright yellow; fore wings light brown, edged with darker and with a dark median streak at middle; antennae blackish brown in most of segments I and II, bright yellow beyond. Head 211, across eyes 140, just behind eyes 119, across cheeks 142, near base 132, across basal collar 134, across head-process 80; cheeks curved rather abruptly to eyes and gently toward base, lightly serrate; dorsal surface with a few anastomosing striae across base, nearly smooth in ocellar area, very faintly rugose medially, with distinct raised lines along cheeks; postocular setae 63, straight, dilated at tip, interval 96, distance from eyes 13; eyes 59, protruding, width 42, interval 56. Antennal segments: I 44 (40), II 57 (31), III 90 (27), IV 84 (25), V 76 (24), VI 59 (23), VII 49 (20), VIII 53 (11); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 117, across coxae 253; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened, the latter prominent; antero-marginal setae vestigial, antero-angulars 56, midlaterals 70, epimerals 80, postero-marginals 86, coxals 53, all of these last nearly straight and with dilated tips; mesothorax 238 across anterior angles; pelta of metathorax well differentiated, not overhanging, not prolonged, reticulate throughout; legs normal, fore tibiae strongly serrate along inner surface, fore tarsi with the usual long recurved tooth; fore wings 630. Abdomen 304 at segment IV; median tergite of I capstan-shaped, reticulate anteriorly; most of following terga with a few mucronate lines and reticles at sides, otherwise nearly smooth; tube 129, across base 66, at tip 35, sides nearly straight, surface smooth, terminal setae 75; other setae long, nearly all knobbed, I and II on IX 124-127, both knobbed.

♀, *forma brachyptera*.—Head paler than in long-winged form, yellowish brown medially; other details of color, and the structure, apparently not different; wing-pads about attaining first abdominal segment.

♂ (brachypterous).—Color and structure essentially as in long-winged ♀, except that the head is yellowish brown medially and the eighth abdominal segment yellowish; glandular area on sternum VIII occupying most of segment.

BRAZIL: Nova Teutonia, S. C., February 1953 to October 1955, Fritz Plaumann, 23 ♀♀ (including holotype, macropterous, taken in August 1954; and morphotype, brachypterous, taken in August 1955) and 6 ♂♂ (including allotype taken in October 1955), under fallen leaves.

***Terthrothrips hebes*, sp. nov.**

Distinct in having the head much more than twice as long as the width just behind eyes, and in having only one sense-cone on the outer surface of the third antennal segment.

♀ (brachypterous).—Length about 1.4 mm. (fully distended, 1.8 mm.). Color of head yellow, heavily shaded with brown along cheeks; prothorax

brown, pterothorax and abdomen blackish brown, the abdomen becoming paler in segments VIII and IX; tube blackish brown, paler across base and in apical half; legs yellow, with femora and tibiae shaded with brown excepting at ends, the femora darker; antennae largely blackish brown in segments I and II, III yellow, IV and V yellow in pedicels, their apical portions and VI-VIII dark gray-brown. Head 216, across eyes 115, just beyond eyes 92, across cheeks 137, near base 123, across basal collar 128, across head-process 75; cheeks evenly arcuate, strongly serrate; dorsal surface reticulate across base, rugose in ocellar area, and with irregular short transverse rugae between these areas, cheeks with short raised lines; postocular setae 65, straight, dilated at tip, interval 75, distance from eyes 17; eyes 46, strongly protruding, coarsely faceted (only 4 or 5 facets in lateral profile), width 27, interval 60. Antennal segments: I 40 (37), II 53 (30), III 77 (25), IV 76 (24), V 70 (23), VI 53 (22), VII 41 (20), VIII 49 (13); sense-cones on III 1 (1), IV 1 (2); all setae pointed. Prothorax 136, across coxae 238; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened; antero-marginal setae vestigial, antero-angulars 72, midlaterals 73, epimerals 80, postero-marginals 87, coxals 48, all of these last nearly straight and with dilated tips; mesothorax 196 across anterior angles; pelta of metathorax only vaguely differentiated, nearly or quite smooth; legs normal, fore tibiae strongly serrate along inner surface, fore tarsi with the usual long recurved tooth. Abdomen 353 at segment IV; median tergite of I little narrowed in anterior portion, not at all capstan-shaped, indistinctly reticulate over most of surface; most of following terga with a few mucronate lines and reticles at sides and with a few irregular anastomosing transverse striae just behind antecostal line; tube 120, across base 66, at tip 34, sides nearly straight, surface smooth, terminal setae 65; other setae long, nearly all knobbed, I on IX 99 and knobbed, II on IX 103 and rounded at tip.

♂ (brachypterous).—Like ♀ in color and general structure; prothorax and fore legs often enlarged; glandular area on sternum VIII traversing the segment just behind antecostal line and occupying about one-fourth of its length.

BRAZIL: Nova Teutonia, S. C., May 1953, February 1954, and 1954, Fritz Plaumann, 6 ♀♀ (including holotype taken in February 1954) and 4 ♂♂ (including allotype taken in May 1953), under fallen leaves.

***Terthrothrips impolitus*, sp. nov.**

Like *irretitus*, only, in having yellow antennae, yellow second abdominal segment, and head reticulate medially throughout its length; but much smaller (head about 210, in comparison with about 258), with stouter antennae, and with anterior angles of pronotum not angulate and tooth-like.

♀ (brachypterous).—Length about 1.4 mm. (fully distended, 1.7 mm.). Color yellow, head narrowly shaded along sides, pterothorax brown, abdominal segment II pale yellow, IV-VI brown, VII-IX successively paler, III-VI with small median brown cloud on antecostal line, tube brown but paler across base and in about apical third; legs yellow; antennal segments I and II largely blackish brown, III-VIII yellow. Head 210, across eyes 128, just behind eyes 106, across cheeks 139, near base 127, across head-process 73; cheeks strongly and evenly convex, prominently serrate; surface sculptured throughout dorsally, though more weakly near postocu-

lar setae, ocellar area and base of head with all reticles complete and polygonal, those at middle less regular, sculpture of cheeks strongly elevated; postocular setae 59, straight, dilated at tip, interval 79, distance from eyes 15; some of small genal setae usually capitate; eyes 49, protruding and prominent, width 34, interval 60. Antennal segments: I 37 (37), II 52 (30), III 72 (26), IV 66 (26), V 66 (24), VI 55 (22), VII 45 (19), VIII 43 (11); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 113, across coxae 242; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened; antero-marginal setae vestigial, coxals 33, all others 60-66, all of these major setae straight and with dilated tips; mesothorax 207 across anterior angles; pelta of metathorax well developed but not overhanging laterally or posteriorly, prolonged nearly to posterior margin of sclerite, distinctly polygonally reticulate; legs normal, fore tibiae indistinctly serrate along inner surface, fore tarsi with the usual recurved tooth. Abdomen 319 at segment IV; median tergite of I little narrowed anteriorly, subtriangular, distinctly reticulate; most of following terga reticulate at sides and reticulo-striate across middle behind antecostal line for about half their length, many of the lateral reticles mucronate; tube 129, across base 68, at tip 32, sides nearly straight, surface nearly smooth, terminal setae 62; other setae long, mostly knobbed, I and II on IX distinctly knobbed, 99 and 109, respectively.

♂ (brachypterous).—Like ♀ in color and general structure; sternum VIII with glandular area occupying about middle half of segment, emarginate at sides.

BRAZIL: Nova Teutonia, S. C., May and November 1953, April and November 1954, Fritz Plaumann, 9 ♀♀ (including holotype taken in April 1954) and 2 ♂♂ (including allotype taken in November 1954), under fallen leaves.

Terthrothrips percultus, sp. nov.

A brilliantly-colored little species, unique in its white-tipped antennae.

♀ (macropterous).—Length about 1.5 mm. (fully distended, 1.8 mm.). Color largely yellow; head clear yellow, slightly darkened in middle of ocellar area, not darkened at sides; prothorax yellow, with bright red internal pigmentation; mesothorax, anterior half of metanotal pelta, and sides of metathorax, brown; abdomen largely bright yellow, with dark red internal pigmentation, shaded in segments II, VIII, and IX, the tube bright yellow and lightly tipped with gray; legs yellow, femora with an indistinct brown cloud at middle; fore wings pale brown, darker in anal lobe, marginally, and medially; antennae pale yellowish brown in segments I and II (II somewhat darker than I), blackish brown in III-V (III yellowish at extreme base, IV and V with a narrow black ring at extreme base followed by a broader yellowish ring), VI gray-brown in most of basal half and fading to pale whitish yellow at tip, VII and VIII pale whitish yellow. Head 210, across eyes 143, just behind eyes 123, across cheeks 141, near base 133, across basal collar 137, across head-process 79; cheeks converging to eyes and slightly toward base of head, widely and lightly serrate; surface smooth in ocellar area and medially, except for a few rows of reticles across base, sculpture of cheeks consisting of widely-spaced slightly-raised lines; postocular setae 62, straight, dilated at tip, interval 75, distance from eyes 14; eyes 56, less

protruding than usual, width 41, interval 62. Antennal segments: I 45 (39), II 55 (30), III 96 (25), IV 93 (25), V 93 (22), VI 63 (21), VII 49 (19), VIII 50 (12); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 164, longer than usual, across coxae 281; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened; antero-marginal setae vestigial, antero-angulars 61, midlaterals 59, epimerals 83, postero-marginals 86, coxals 50, all of these last nearly straight and with dilated tips; mesothorax 235 across anterior angles; pelta of metathorax well developed but not overhanging laterally or posteriorly, prolonged nearly to posterior margin of sclerite, distinctly polygonally reticulate; legs normal, fore tibiae distinctly serrate along inner surface, fore tarsi with the usual long recurved tooth; fore wings 694. Abdomen 295 at segment III; median tergite of I capstan-shaped, distinctly reticulate over most of surface; most of following terga with a few mucronate lines and reticles at sides and with one irregular transverse stria just behind antecostal line; tube 129, across base 65, at tip 33, sides very slightly concave near base, otherwise about straight, surface nearly smooth, terminal setae 65; other setae long, mostly knobbed, I on IX 97 and knobbed, II on IX with modified tip, 103.

♂ (micropterous).—Like female in color and general structure; sternum VIII largely occupied by a glandular area; *heterogonic major* individuals with prothorax and fore legs greatly enlarged in comparison with those of *heterogonic minor* individuals, the length of pronotum ranging from 211 to 126, width from 308 to 225.

BRAZIL: Nova Teutonia, S. C., May 1953 and April 1954, 24 ♀♀ (including holotype taken in April 1954) and 9 ♂♂ (including allotype and morphotypes taken with holotype), under fallen leaves.

Phragmothrips, gen. nov.

(*phragmos*, a partition; *thrips*—in allusion to the pronotal apodemes)

Allied to *Terthrothrips*, but with a pair of prominent, distally-expanded, ventro-lateral setae on mesothorax and metathorax and with a pair of short apodemes at anterior angles of pronotum, these extending backwards between the antero-angular and midlateral setae. Head smooth dorsally in median area, lightly sculptured at sides; mouth-cone short and rounded; antennae 8-segmented, slender, last segment pedicellate, sense-cone formula III 1 (2), IV 2 (2), V and VI each 1 (1), all setae pointed. Pronotum almost perfectly smooth; femora and tibiae not closely covered with minute setae; fore femora without strong outstanding setae on dorsal surface; fore coxal seta relatively large, at least one-half as long as postoculars; fore wings without accessory setae on hind margin, hind wings with a minute dark dot between each two fringing hairs.

Type species: *Phragmothrips majusculus*, sp. nov.

Phragmothrips majusculus, sp. nov.

Readily known from its congeners by its much larger size and relatively longer tube, this being longer than twice its basal width and longer than the greatest width across cheeks.

♀ (macropterous).—Length about 1.8 mm. (distended, 2.2 mm.). Color chestnut brown, somewhat paler in head, across base of tube, and in apical third of latter; femora yellowish brown, yellow at either end, fore and

mid tibiae yellow but shaded with brown, hind tibiae and all tarsi yellow; fore wings brown, darkest in scale and apically, paler in about basal three-fifths save for a dark costal streak starting near last subbasal seta and for the largely dark posterior half, middle third with an evanescent pale submarginal line; posterior half of hind wings with the usual dark dot between each two fringing setae; antennae nearly uniform blackish brown, with basal fourth of segment III yellow, IV-VI with a dark ring at extreme base and abruptly yellow beyond for a short distance. Head 227, across eyes 158, just behind eyes 143, across cheeks 162, near base 150, across basal collar 160, across head-process 88; surface smooth except along cross-striate cheeks, no sculpture in ocellar area or medially in front of occipital line; postocular setae 77, expanded apically, interval 123, distance from eyes 16; eyes 76, width 52, interval 59 (in a paratype); mouth-cone rounded, 83. Antennal segments: I 51 (43), II 59 (30), III 95 (30), IV 116 (29), V 119 (26), VI 90 (23), VII 52 (19), VIII 55 (13-14). Prothorax 159, across coxae 309; pronotum smooth, without striae along posterior margin; antero-marginal setae vestigial, antero-angulars 82, midlaterals and epimerals 94, postero-marginals 101, coxals 60, all expanded at tip; mesothorax about 312 across anterior angles; pelta of metanotum delimited laterally by a slightly overhanging hook and posteriorly (usually) by two concentric elevated arcs, its surface lightly polygonally reticulate but nearly smooth between the two major setae; fore tarsi with a moderately strong recurved tooth on inner surface; fore wings 896, with the usual three strong knobbed subbasal setae. Abdomen 378 at segment III; median tergite of I reticulate in anterior half; remainder of dorsal surface almost perfectly smooth; tube 176, across base 77, at tip 40, sides straight, terminal setae 113; most setae dilated at tip, IX with I 148, II 182, both slightly dilated at tip.

♂ (macropterous).—Like female in color and structure; pronotum, fore legs, and tarsal tooth sometimes enlarged; glandular area occupying most of sternum VIII.

BRAZIL: Nova Teutonia, S. C., February 1953 to September 1955, Fritz Plaumann, 7 ♀♀ (including holotype taken in September 1955) and 3 ♂♂ (including allotype taken in October 1954), under fallen leaves.

Phragmothrips paulus, sp. nov.

Like the following species (*inuncatus*) in lacking a pale and less-sclerotized subbasal ring on antennal segments IV and V; but with the pelta of metathorax defined at sides by the usual slightly overhanging hook-shaped fold and smooth in the broad basal area, antennal segments slightly slenderer, setae shorter (I on abdominal tergum III about 60 μ long), and median tergite of I narrower, its apical portion about 50 μ wide.

♀ (brachypterous).—Length about 1 mm. (fully distended, 1.3 mm.). Color almost uniform blackish brown, with the usual red internal pigmentation; head darker than prothorax, not pale between eyes, nearly black along sides; tube paler across base and in about apical half; legs deep yellow, lightly washed with brown; antennae nearly uniform blackish brown, yellow in pedicel of segment III, IV-VI without pale subbasal ring. Head 137, across eyes 103, behind eyes 99, across cheeks 113, near base 103, across basal collar 105, across head-process 58; surface smooth except along the rather heavily cross-striate cheeks (these thus roughened

or coarsely serrate), no sculpture in ocellar area or medially in front of occipital line; postocular setae 45, expanded apically, interval 74, distance from eyes 8; eyes 40, width 27, interval 50; mouth cone rounded, 37. Antennal segments: I 30 (30), II 40 (25), III 52 (24), IV 49 (24), V 52 (23), VI 45 (19), VII 32 (16), VIII 35 (10). Prothorax 86, across coxae 179; pronotum smooth, without striae along posterior margin; antero-marginal setae vestigial, antero-angulars, midlaterals, and epimerals 45-47, postero-marginals 52, coxals 37, all slightly expanded at tip; mesothorax about 168 across anterior angles; pelta of metanotum delimited laterally by a slightly overhanging hook-shaped loop and posteriorly usually by a line or more of sculpture, its surface smooth; fore tarsi with the usual moderately strong recurved tooth on inner surface; wing-pads about attaining second abdominal tergum, with the usual three long dilated subbasal setae. Abdomen 221 at segment IV; median tergite of I relatively narrow, its apical portion about 50 wide, its surface lightly reticulate in about anterior half; remainder of dorsal surface nearly smooth; tube 88, across base 52, at tip 27, sides straight, terminal setae 47; most setae dilated at tip, I on III about 60, IX with I and II 81-83, both slightly dilated at tip.

♂ (brachypterous).—Like female in color and structure; glandular area occupying most of sternum VIII, faintly granulate.

BRAZIL: Nova Teutonia, S. C., August 1952 to September 1955, 12 ♀ ♀ (including holotype taken in September 1955) and 6 ♂ ♂ (including allotype taken in August 1952); Erechim, Rio Grande do Sul, August 1956, 2 ♀ ♀. All specimens were taken by Mr. Fritz Plaumann under fallen leaves.

Phragmothrips inuncatus, sp. nov.

Like the preceding species (*paulus*) in lacking a pale and less sclerotized subbasal ring on antennal segments IV and V; see above description for comparison of the two.

♀ (brachypterous).—Length about 1.1 mm. (fully distended, about 1.4 mm.). Color almost uniform blackish brown, with the usual red internal pigmentation; head darker than prothorax, not pale between eyes, not especially darkened along sides; tube paler across base and in about apical half; legs deep yellow, lightly washed with brown; antennae nearly uniform blackish brown, yellow in pedicel of III. Head 143, across eyes 114, behind eyes 107, across cheeks 122, near base 112, width across basal collar 116, across head-process 64; surface smooth except along the cross-striate cheeks (these thus rather finely serrate), no sculpture in occipital area, a few very faint striae in front of occipital line; postocular setae 52, expanded apically, interval 89, distance from eyes 10; eyes 48, width 30, interval 54; mouth-cone rounded, 50. Antennal segments: I 34 (32), II 45 (26), III 53 (27), IV 53 (26), V 53 (24), VI 49 (22), VII 36 (19), VIII 40 (12). Prothorax 100, across coxae 196; pronotum nearly smooth but with a few short striae almost behind postero-marginal setae; antero-marginal setae vestigial, antero-angulars 44, midlaterals 52, epimerals 51, postero-marginals 71, coxals 44, all slightly expanded at tip; mesothorax about 196 across anterior angles; pelta of metanotum delimited laterally by a slightly overhanging arc (rather than by a hook-like line), reticulate throughout though very faintly medially; fore tarsi with the usual moderately strong recurved tooth on inner surface; wing-

pads not attaining first abdominal tergum, with the usual three long dilated subbasal setae. Abdomen 245 at segment III; median tergite of I relatively broad, its apical portion about 70 wide, its surface smooth; tube 101, across base 57, at tip 29, sides straight, terminal setae 66; most setae dilated at tip, I on III about 80, IX with I and II 103-104, these last slightly dilated at tip.

♂ (brachypterous).—Like female in color and structure; glandular area occupying most of sternum VIII, faintly granulate.

BRAZIL: Nova Teutonia, S. C., September 1953 and April 1954, Fritz Plaumann, 22 ♀♀ (including holotype taken in April 1954) and 1 ♂ (allotype, April 1954), under fallen leaves.

Phragmothrips achaetus, sp. nov.

Recognizable at once by the vestigial antero-angular setae.

♀ (macropterous).—Length about 1.3 mm. (fully distended, 1.6 mm.). Color almost uniform blackish brown, with the usual red internal pigmentation, head darker than prothorax, yellowish between eyes, nearly black along sides, tube paler basally and in about apical half; legs deep yellow, lightly washed with brown; fore wings brown, darkest in scale and apically, paler in about basal three-fifths save for a dark costal streak starting near last subbasal seta and for a dark nearly median streak in about middle third, slightly paler for a short distance behind and beyond distal end of this streak; posterior half of hind wings with the usual dark dot between each two fringing setae; antennae nearly uniform blackish brown, paler at extreme base of segment III, IV-VI with a narrow dark ring at extreme base and an abrupt white ring immediately beyond. Head 176, across eyes 123, behind eyes 106, across cheeks 123, near base 114, across basal collar 117, across head-process 67; surface smooth except along cross-striate cheeks, no sculpture in ocellar area or medially in front of occipital line; postocular setae 61, expanded apically, interval 88, distance from eyes 11; eyes 63, width 39, interval 43; mouth-cone rounded, 64. Antennal segments: I 36 (34), II 47 (27), III 75 (23), IV 83 (24), V 84 (22), VI 60 (19), VII 40 (16), VIII 46 (10). Prothorax 103, across coxae 202; pronotum smooth, without striae along posterior margin; antero-marginal and antero-angular setae vestigial (3-5), mid-laterals 55, epimerals 66, postero-marginals 69, coxals 49, all expanded at tip; mesothorax about 195 across anterior angles; pelta of metanotum delimited laterally by a slightly overhanging hook and posteriorly (usually) by about two irregular elevated concentric arcs, its surface lightly polygonally reticulate between these arcs and basally but nearly smooth between the two major setae; fore tarsi with a moderately strong recurved tooth on inner surface; fore wings 511, with the usual three strong dilated subbasal setae. Abdomen 252 at segments III-IV; median tergite of I smooth; remainder of dorsal surface almost perfectly smooth; tube 107, across base 57, at tip 28, sides straight, terminal setae 52; most setae dilated at tip, IX with I 100, II 107, both slightly dilated at tip.

♂ (macropterous).—Like female in color and structure; pronotum, fore legs, and tarsal tooth sometimes enlarged, the femora then bent at base; glandular area occupying most of sternum VIII, faintly granulate.

BRAZIL: Nova Teutonia, S. C., September and October 1954, and August to October, 1955, Fritz Plaumann, 18 ♀♀ (including holotype

taken in August 1955) and 9 ♂♂ (including allotype taken in September 1955), under fallen leaves.

Copiothrips, gen. nov.

(*kope*, oar; *thrips*—in allusion to the four expanded setae projecting laterally from the pterothorax)

Head usually striate medially, sometimes nearly smooth except at sides, occasionally reticulate throughout, but with the polygons not equilateral and with the lines separating the reticles tending to form straight diagonal lines in the median area and behind the postocular setae; mouth-cone short and rounded; antennae 8-segmented, not especially slender, the last segment pedicellate, segment IV longer than III, sense-cone formula, III 1 (2), IV 2 (2), V and VI each 1 (1), inner apical seta on II usually broadened at tip, some apical setae on III and IV either dilated or with tips modified. Mesothorax and metathorax each with a pair of prominent, outstanding, distally-expanded setae arising from ventro-lateral surface; femora and tibiae not closely covered with minute setae; fore femora with two strong outstanding setae (usually knobbed) near middle of the morphologically dorsal surface, middle and hind femora each with one; fore coxal seta relatively small, less than one-half the length of postoculars; fore tibiae not serrate along inner surface; fore tarsi toothed; fore wings without accessory setae on hind margin, hind wings without a minute dark dot between each two fringing hairs.

Type species: *Copiothrips fuscifrons*, sp. nov.

Allied to *Eurythrips*, *Terthrothrips*, etc.; distinguished from most of these by the ventro-lateral pterothoracic setae, from the others by the sculptured head and shorter antennal segments.

Copiothrips fuscifrons, sp. nov.

Differs from *fulvescens* in that the head is much darkened between the eyes and in front, about 164 μ across cheeks; sculpture of head, thorax, and abdomen much weaker, the cheeks scarcely serrate, the reticulation of the pelta of metathorax very indistinct between the two major setae, sculpture at sides of tergum II of abdomen weak and only sparsely mucronate; postoculars and other major setae less modified and less bent at tip; sternum VIII of female with a small pair of setae between and behind the large pair at lateral thirds of posterior margin; sides of tube somewhat concave.

♀ (macropterous).—Length about 1.6 mm. (fully distended, 1.9 mm.). Color chestnut brown, darkest between and anterior to eyes, along sides of pterothorax, and in apical abdominal segments, tube somewhat paler across base and in about apical half; legs yellow but shaded lightly with brown in femora and tibiae; fore wings brown or gray; antennae darkest and blackish in segments I and II, III largely yellow but clouded with darker beyond pedicel and again in apical third, IV and V yellow in about basal third, and shaded beyond, V darker than IV, VI-VIII dark gray-brown. Head 183, across eyes 154, just behind eyes 148, across cheeks 164, near base 145, across head-process 78; surface reticulate along cheeks, closely striate medially across base, lightly reticulate medially from there to median ocellus, cheeks not noticeably serrate; postocular setae 74, somewhat curved, asymmetrically dilated at tip, interval 130, distance from eyes 16; eyes 63, width 45, interval 63; mouth-cone

rounded, 72. Antennal segments: I 37 (39), II 51 (29), III 70 (32), IV 74 (29), V 73 (26), VI 60 (22), VII 44 (20), VIII 49 (13), sense-cones on III 1 (2), IV 2 (2). Prothorax 109, across coxae 265; pronotum with a few faint striae across posterior margin, remainder smooth; antero-marginal setae vestigial, antero-angulars 68, midlaterals 64, epimerals 87, postero-marginals 92, coxals 24, all curved and asymmetrically dilated at tip; mesothorax 279 across anterior angles; metanotum with differentiated pelta, this rounded posteriorly and reticulate, nearly smooth between the two major setae; fore wings 748, with the usual three knobbed subbasal setae; fore tarsi with a minute tooth on inner surface. Abdomen 340 at segment IV; median tergite of I lightly reticulate; II lightly reticulate laterally, the reticular lines sparsely mucronate, especially the basal ones; tube 153, across base 71, at tip 32, terminal setae 89; most setae dilated at tip, IX with I 132 and rapidly pointed, II 150 and finely pointed.

♂ (macropteros).—Like female in color and structure; glandular area occupying most of sternum VIII, its lateral edges emarginate.

BRAZIL: Nova Teutonia, S. C., May 1953 to September 1955, Fritz Plaumann, 14 ♀♀ (including holotype taken in April 1954) and 1 ♂ (allotype, taken in August 1955), under fallen leaves.

Copiothrips flaviventris, sp. nov.

The principal diagnostic characters of this species are as follows: (1) tube shorter than head, (2) antennae very slender (see measurements in following description), (3) head very long, about 1.6 times as long as width across eyes, (4) abdomen (including tube) yellow or yellowish, without dark median spots, and (5) median tergite of first abdominal segment nearly triangular and reticulate almost throughout.

♀, *forma macroptera*.—Length about 1.8 mm. (fully distended, 2.2 mm.). Color brownish yellow, thorax, sides of head, and middle of tube darkened with brown; legs about concolorous with body but with tibiae darkened; fore wings light brown, with a postmedian dark line before middle; antennae dark brown, yellow or yellowish in pedicels of III-VI. Head 251, across eyes 159, just behind eyes 138, across cheeks 159, near base 138, across basal collar 141, across head-process 86; cheeks serrate, only slightly convex, rounded to eyes and tapering toward base; surface lightly reticulate in ocellar area, more distinctly so from occipital line to occipital setae, strongly so along cheeks, the entire remainder of dorsum cross-striate with anastomosing lines; postocular setae 30, dilated and bent at tip, their interval 121, distance from eyes 10; eyes 66, width 46, interval 67, rather finely faceted. Antennal segments: I 48 (45), II 57 (33), III 90 (31), IV 114 (29), V 112 (27), VI 83 (22), VII 53 (21), VIII 54 (13); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II and several on each of III and IV dilated at tip. Prothorax 130, across coxae 279; pronotum striate except at middle; antero-marginal setae vestigial, antero-angulars 50, midlaterals 44, epimerals 81, postero-marginals 64, coxals 19, all of these strong, with dilated bent tips; mesothorax 291 across anterior angles; metanotal pelta well differentiated, reticulate, prolonged backward to margin of sclerite; fore tarsi with moderately large recurved tooth; fore wings 889, with the three subbasal setae successively larger, dilated at tip. Abdomen 377 at segment III, median tergite of I subtriangular, with rounded corners, reticulate

nearly throughout; following terga distinctly sculptured except along the smooth posterior margin, reticulate and partially mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 179, across base 69, at tip 34, sides thickened and nearly straight, surface nearly smooth, terminal setae 95; other setae long, most of them with bent dilated tips, I on IX 130 and with tip slightly dilated, II 150 and with tip rounded.

♀, *forma brachyptera*.—Like long-winged ♀ in color and structure; wing-pads about 112, with one long dilated seta.

♂ (brachypterous).—Like ♀ in color and general structure; glandular area on sternum VIII occupying most of segment.

BRAZIL: Nova Teutonia, S. C., May 1953 to October 1955, Fritz Plaumann, 1 macropterous ♀ (holotype, taken in November 1954), 3 brachypterous ♀♀ (including morphotype taken in October 1955), and 4 ♂♂ (including allotype taken in May 1953), under fallen leaves.

***Copiothrips fulvescens*, sp. nov.**

♀ (brachypterous).—Length about 1.3 mm. (partially distended, 1.5 mm.). Color brown, abdomen darkest and blackish, head pale yellowish brown but darkened along sides and nearly yellow anteriorly, pterothorax darker than prothorax and paler than abdomen; legs bright yellow; antennae brown in segments I, II, and IV-VIII, III yellow or shaded apically, base of IV yellow or at least pale. Head 170, across eyes 123, just behind eyes 115, across cheeks 132, near base 121, across head-process 69, surface deeply sculptured along cheeks, faintly reticulate in ocellar area, more distinctly so medially to occipital line and across base, cheeks strongly serrate; postocular setae 53, strongly curved (especially apically) and with an asymmetrical golf-club-shaped tip, interval 100, distance from eyes 14; eyes 49, width 35, interval 54; mouth-cone rounded, 49. Antennal segments: I 36 (35), II 46 (29), III 59 (27), IV 60 (27), V 58 (24), VI 46 (23), VII 37 (19), VIII 41 (13), sense-cones on III 1 (2), IV 2 (2). Prothorax 94, across coxae 218; pronotum with a few faint striae anterior to episterna and along posterior margin, remainder smooth; antero-marginal setae vestigial, antero-angulars 56, midlaterals 55, epimerals 91, postero-marginals 75, coxals 20, all formed and curved like postoculars, the expanded tips of epimerals about 18 μ long; mesothorax about 213 across anterior angles; pelta of metanotum reticulated throughout, to posterior margin of the sclerite; fore tarsi with a small tooth on inner surface. Abdomen 294 at segment III; median tergite of I distinctly reticulate; II distinctly reticulate laterally and lightly medially at base, the lateral reticular lines largely mucronate, even in basal part of tergum; tube 151, across base 65, at tip 30, its sides straight, terminal setae 80; most setae dilated and strongly bent at tip, IX with I 136 and dull, II 154 and finely pointed.

♂ (brachypterous).—Like female in color and structure; glandular area occupying most of sternum VIII, its lateral edges emarginate.

BRAZIL: Nova Teutonia, S. C., August 1952 to October 1955, 9 ♀♀ (including holotype taken in July 1955) and 2 ♂♂ (including allotype taken in February 1954), Fritz Plaumann; under fallen leaves.

***Copiothrips subglaber*, sp. nov.**

Known at once from the other species in which the tube is longer than the head by the pointed antennal setae, the smooth head at middle of

dorsal surface, and the shield-shaped metanotal pelta whose reticulation is not prolonged posteriorly to the margin of the sclerite.

♀ (macropterous).—Length about 1.6 mm. (fully distended, 2.0 mm.). Color chestnut brown, somewhat paler in head; tube brownish yellow in about basal fifth and pale again at tip, nearly blackish brown between; legs about concolorous with body, with tarsi and both ends of femora and tibiae yellowish; fore wings light brown, darker in scale, medially, and marginally; antennae about concolorous with body, with pedicel of III yellow. Head 203, across eyes 152, just behind eyes 136, across cheeks 156, near base 136, across basal collar 137, across head-process 79; cheeks serrate, rounded to eyes from anterior third, tapering toward case, often with a slight tooth behind eyes; surface faintly reticulate in ocellar area, reticulo-striate across base, and distinctly reticulate along sides, almost perfectly smooth at middle; postocular setae 48, slightly curved, dilated at tip, 124 apart and 16 from eyes; eyes 63, width 43, interval 67, rather finely faceted. Antennal segments: I 46 (40), II 56 (30), III 80 (33), IV 95 (30), V 83 (27), VI 68 (24), VII 44 (20), VIII 50 (15); sense-cones on III 1 (2), IV 2 (2); all setae pointed. Prothorax 117, across coxae 265; pronotum lightly striate along posterior margin, smooth elsewhere; antero-marginal setae vestigial, antero-angulars small, only 28, midlaterals 46, epimerals 67, postero-marginals 68, coxals 16, all slightly curved and slightly dilated at tip; mesothorax 269 across anterior angles; metanotal pelta well differentiated, shield-shaped, pointed behind, and reticulate, the reticulation not carried to posterior margin of sclerite; fore tarsi with the usual recurved tooth short; fore wings 770, with the usual three large somewhat dilated subbasal setae. Abdomen 321 at segment IV; median tergite of I subtriangular, with rounded corners and a darker, reticulated, oval, median portion; following terga lightly sculptured except along the smooth posterior margin, reticulate and only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 227, across base 79, at tip 36, sides thickened and straight, surface smooth, terminal setae 109; other setae moderately long, with blunt or slightly dilated tips, I on IX 142 and rounded at tip, II 216 and pointed.

♂ (macropterous).—Like ♀ in color and general structure; glandular area on sternum VIII occupying more than one half its length and most of its width, emarginate at sides.

BRAZIL: Nova Teutonia, S. C., May 1953 to October 1955, Fritz Plaumann, 60 ♀♀ (including holotype taken in April 1954) and 14 ♂♂ (including allotype taken with holotype), under fallen leaves.

Copiothrips brasiliensis, sp. nov.

Like *subglaber* and *ustulatus* in having the tube longer than the head; differing from former in having the inner apical seta on segment II and several of the dorsal ones on III and IV dilated at tip, in having the head cross-striate medially, and the metanotal pelta prolonged to posterior margin of the sclerite; agreeing with *ustulatus* in these characters, but differing in the smaller size, less slender antennae, and the less finely reticulate pelta of the metanotum.

♀ (macropterous).—Length about 1.5 mm. (fully distended, 1.9 mm.). Color chestnut brown, head a trifle darker than prothorax; tube blackish

brown, narrowly paler across base and at tip; legs somewhat paler than body, with tarsi and both ends of femora and tibiae paler, fore tibiae often darkest; fore wings light brown, darker in scale, medially, and marginally; antennae about concolorous with head in segments I and II, III dull yellow but lightly shaded apically, IV-VI successively darker but with their pedicels pale yellow, VII and VIII dark gray-brown. Head 196, across eyes 151, just behind eyes 136, across cheeks 151, near base 140, across basal collar 145, across head-process 76; cheeks serrate, rounded to eyes from anterior third, tapering toward base; surface reticulate in ocellar area, reticulo-striate across base, and distinctly reticulate along sides, the entire remaining median area striate with anastomosing lines; postocular setae 57, curved, with rather long spoon-shaped tips, their interval 119, distance from eyes 19; eyes 63, width 46, interval 59, rather finely faceted. Antennal segments: I 37 (39), II 53 (30), III 73 (31), IV 81 (30), V 79 (25), VI 58 (23), VII 47 (20), VIII 52 (15); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II and usually about two on III and IV dilated at tip. Prothorax 87, across coxae 262; pronotum lightly striate along posterior margin, nearly smooth elsewhere; antero-marginal setae vestigial, antero-angulars 60, midlaterals 64, epimerals 81, postero-angulars 97, coxals 21, all of these dilated like postoculars and with their tips bent inwards; mesothorax 276 across anterior angles; metanotal pelta well differentiated, reticulate, prolonged backward to margin of sclerite, and with about four reticles between the two major setae; fore tarsi with moderately large recurved tooth; fore wings 748, with the usual three large somewhat dilated subbasal setae. Abdomen 350 at segments III-IV; median tergite of I subtriangular, with rounded corners and a darker, reticulated, oval, median portion; following terga lightly sculptured except along the smooth posterior margin, reticulate and partially mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 210, across base 77, at tip 35, sides thickened and straight, surface smooth, terminal setae 87; other setae long, slightly curved and with bent dilated tips, I on IX 131 and very slightly dilated, II 164 and very finely pointed.

♂, *forma brachyptera* and *forma macroptera*.—Like female in color and general structure; glandular area on sternum VIII occupying most of segment.

BRAZIL: Nova Teutonia, S. C., May 1953 to October 1955, Fritz Plau-mann, 52 ♀♀ (including holotype taken in April 1954), 17 brachypterous ♂♂ (including allotype taken with holotype), and 2 macropterous ♂♂ (including morphotype taken in September 1955), under fallen leaves.

***Copiothrips ustulatus*, sp. nov.**

See preceding species, *brasiliensis*, for separation from allies.

♀, *forma macroptera*.—Length about 1.7 mm. (fully distended, 2.2 mm.). Color chestnut brown, tube darkest and somewhat paler apically, the legs concolorous with body; fore wings brown, darkened medially and marginally; antennae about concolorous with body, pedicels of III-VI yellowish. Head 217, across eyes 161, just behind eyes 147, across cheeks 167, near base 143, across basal collar 144, across head-process 86; cheeks serrate, rounded to eyes from anterior fourth, tapering toward base; surface reticulate in ocellar area, reticulo-striate across base, and distinctly reticulate along sides, the entire remaining median area striate with

anastomosing lines; postocular setae 65, curved, with rather long spoon-shaped tips, their intervals 128, distance from eyes 20; eyes 66, width 48, interval 66, rather finely faceted. Antennal segments: I 47 (43), II 56 (35), III 83 (30), IV 93 (30), V 90 (27), VI 72 (23), VII 51 (22), VIII 56 (16); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II and 4-5 on III and IV dilated at tip. Prothorax 97, across coxae 284; pronotum lightly striate along posterior margin and in front of episterna, nearly smooth elsewhere; antero-marginal setae vestigial, antero-angulars 50, midlaterals 70, epimerals 83, postero-marginals 82, coxals 20, all of these dilated like postoculars and with their tips bent slightly inwards; mesothorax 294 across anterior angles; metanotal pelta well differentiated, reticulate, prolonged backward to margin of sclerite, and with about six reticles between the two major setae; fore tarsi with moderately large recurved tooth; fore wings 896, with the usual three large somewhat dilated subbasal setae. Abdomen 420 at segment III; median tergite of I subtriangular, with rounded corners and a darker, reticulated, oval median portion; following terga distinctly sculptured except along the smooth posterior margin, reticulate and partially mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 252, across base 88, at tip 40, sides thickened and straight, surface smooth, terminal setae 99; other setae long, slightly curved, and with dilated tips, I on IX 134 and dilated, II 185 and finely pointed.

♀, *forma brachyptera*.—Like long-winged female in color and structure; wing-pads extending to second abdominal segment.

♂ (brachypterous).—Like ♀ in color and general structure; glandular area on sternum VIII occupying most of width of segment, emarginate at sides and in front, its median length about one-third that of segment.

BRAZIL: Nova Teutonia, S. C., November 1952, 1 macropterous ♀ (holotype); July 1955, 1 brachypterous ♀ (morphotype) and 1 ♂ (allotype); and October 1955, 2 macropterous ♀ ♀; all specimens taken by Mr. Fritz Plaumann, under fallen leaves.

Orthothrips divergens, sp. nov.

Readily known from *woytkowskii* (presumably the only other species of the genus which has the tube longer than the head and seta I on abdominal segment IX considerably longer than the basal width of tube) by the more slender head (nearly 1.5 times as long as width across eyes and 1.8 times as long as least width near base), and the lightly reticulate third to sixth antennal segments.

♀ (macropterous).—Length about 1.8 mm. (fully distended, 2.1 mm.). Color chestnut brown, becoming decidedly yellowish toward tip of abdomen, tube yellow at base and brown beyond; legs yellow, femora lightly shaded with brown; fore wings light brown, somewhat darkened marginally at tip and with a short dark streak at middle; antennae dark brown in most of segments I and II, all of III and pedicel of IV deep golden yellow, their remainder dark brown but usually with pedicels of V and VI yellowish. Head 234, across eyes 160, just behind eyes 140, across cheeks 160, near base 130, across basal collar 133, across head-process 87; cheeks curving abruptly to eyes in anterior fifth, remainder straight and converging to base; surface polygonally reticulate, more finely in ocellar area and along sides, the cheeks thus finely serrate; postocular setae small (14), obliquely truncate at tip, curved inward, 123 apart and 16 from

eyes; eyes 63, width 47, interval 67. Antennal segments: I 43 (40), II 60 (34), III 80 (33), IV 79 (30), V 79 (28), VI 63 (24), VII 47 (20), VIII 51 (14); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II dilated, III and IV each with about three setae whose tips are slightly dilated, blunt, or otherwise modified. Prothorax 110, across coxae 266; pronotum reticulate over most of surface, posterior margin with several raised mucronate transverse lines; antero-marginal setae vestigial, antero-angulars, midlaterals, and postero-marginals 22-30, stout, dilated at tip, and somewhat appressed, epimerals 53, much stouter, dilated, coxals 13; mesothorax 281 across anterior angles; pelta of metathorax well differentiated, extending to posterior margin of sclerite, reticulate throughout, the more posterior reticles mucronate; fore tarsi with small tooth; fore wings 781. Abdomen 351 at segment III; median tergite of I with anterior part subrectangular and reticulate; following terga reticulate (except posteriorly), the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 288, across base 89, at tip 39, sides straight, surface lightly polygonally reticulate near base, terminal setae 104; other setae short, curved, nearly all dilated at tip, I on IX 118 and knobbed, II 217 and pointed.

♂ (macropterous).—Very similar to female in color and general structure; glandular area on sternum VIII transversely elliptical, situated at middle of segment.

BRAZIL: Nova Teutonia, S. C., February 1953 to October 1955, Fritz Plaumann, 28 ♀♀ (including holotype taken in April 1954) and 6 ♂♂ (including allotype taken in April 1954), under fallen leaves.

Orthothrips saltuarius, sp. nov.

Very close to *hylaesus*, but with the first and second antennal segments yellow and about concolorous with middle of head, the head itself nearly 1.5 times as long as its width across eyes in ♀, and antennal segment IV about 2.6 times as long as wide in ♀.

♀, *forma macroptera*.—Length about 1.7 mm. (fully distended, 2.0 mm.). Color brownish yellow, with pterothorax and sides of head and of prothorax brown; tube brown, yellowish across base; abdomen with a median brown spot behind antecostal line on segments III-VII; legs deep yellow; fore wings yellowish brown; antennae with segments I-IV deep yellow, IV lightly shaded with brown beyond pedicel, V and VI yellow to first whorl of setae and brown beyond, VII and VIII gray-brown. Head 213, across eyes 145, just behind eyes 127, across cheeks 141, near base 118, across basal collar 120, across head-process 78; cheeks narrowed abruptly to eyes, slightly convex in most of their remainder; surface polygonally reticulate, more finely in ocellar area and along sides, the cheeks thus finely serrate; postocular setae small (17-21), expanded and obliquely truncate at tip, curved inward, 114 apart and 16 from eyes; eyes 60, width 39, interval 68. Antennal segments: I 43 (37), II 50 (33), III 74 (27), IV 70 (27), V 70 (24), VI 56 (20), VII 43 (20), VIII 42 (13); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II dilated, III and IV each with about four apically-dilated setae. Prothorax 123, across coxae 239; pronotum reticulate throughout except between and behind postero-marginal setae, where it is transverse striate, the striae not mucronate; antero-marginal setae vestigial, antero-angulars and midlaterals 18-19, epimerals and postero-marginals 30-31, all of these last

stout and dilated at tip, coxals minute (13) but dilated; pelta of metathorax well differentiated, extending to posterior margin of sclerite, sharply reticulate throughout, the posterior reticles not mucronate; fore tarsi with the usual recurved tooth; fore wings 840. Abdomen 336 at segment III; median tergite of I broad, trapezoidal, with rounded corners, with a reticulated median portion which is broader anteriorly; following terga reticulate (except posteriorly), the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 179, across base 61, at tip 29, sides straight, surface lightly polygonally reticulate basally, terminal setae 73; other setae short, curved, nearly all dilated at tip, I on IX 86 and knobbed, II 102 and slightly dilated.

♀, *forma brachyptera*.—Not appreciably different from long-winged form in either color or structure.

♂ (brachypterous).—Like ♀ in color and general structure; glandular area on sternum VIII occupying most of segment.

BRAZIL: Nova Teutonia, S. C., May 1953 to September 1956, Fritz Plaumann, 7 macropterous ♀♀ (including holotype taken in February 1954), 47 brachypterous ♀♀ (including morphotype taken in September 1955), and 2 ♂♂ (including allotype taken in October 1955), under fallen leaves.

***Erkosothrips* silvaticus*, sp. nov.**

Very different from the following species (*bucca*), which is the only other South American species assigned to the genus, differing in the much longer tube, the presence of two pairs of long, knobbed, ventro-lateral pterothoracic setae, and the possession of two sense-cones on each side of the fourth antennal segment.

♀ (brachypterous).—Length about 1.6 mm. (fully distended, 2.0 mm.). Color nearly uniform brownish yellow, with dark antecostal line followed by a dark spot on abdominal segments III-VIII; legs concolorous with body; antennae with segments I-III about concolorous with head, II heavily shaded at sides, III shaded apically, IV-VIII dark blackish brown, IV and V yellow or yellowish to first whorl of setae. Head 189, across eyes 140, just behind eyes 120, across cheeks 145, near base 119, across basal collar 124, across head-process 80; cheeks hollowly narrowed to eyes from an apical tooth, roundly arched and narrowed toward base; surface polygonally reticulate throughout, more finely in ocellar area, the cheeks serrate; postocular setae 43, expanded at tip, curved inward, 123 apart and 14 from eyes; eyes 51, width 35, interval 71. Antennal segments: I 42 (38), II 53 (32), III 73 (29), IV 66 (28), V 64 (26), VI 56 (22), VII 43 (20), VIII 46 (13-14); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II dilated, III and IV each with two or three setae more or less dilated. Prothorax 113, across coxae 241; pronotum striate along posterior margin, lightly reticulate elsewhere; antero-marginal setae small and pointed, all others strong, curved, and dilated at tip, coxals 18, the others 49-56; pelta of metathorax well differentiated, extending nearly to posterior margin of sclerite, reticulate throughout;

**Erkosothrips* Stannard. This generic name is apparently based on a Greek word meaning a net, and doubtless refers to the elaborate reticulation, especially of the head. The prescribed transliteration of the word is *hercos*, and the proper combination with *thrips* would result in *Hercothrips*—a name which has previously been used. (See the International Code of Zoological Nomenclature, or Ferris's *The Principles of Systematic Entomology*, or Schenk and McMasters' *Procedure in Taxonomy*.)

fore tarsi with the usual recurved tooth. Abdomen 339 at segment III; median tergite of segment I broad, reticulate, sides slightly converging anteriorly; following terga sculptured excepting along posterior margin, reticulate but only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 163, near base 69, at tip 30, sides thickened, straight beyond basal pores, surface nearly smooth, terminal setae 92; other setae long, curved, nearly all dilated at tip, I on IX 126 and knobbed, II 146 and pointed.

♂ (brachypterous).—Like ♀ in color and general structure; glandular area on sternum VIII forming an irregular narrow band across middle of segment, occupying about one-fourth the length and two-thirds the width.

BRAZIL: Nova Teutonia, S. C., August 1952 to July 1955, Fritz Plaumann, 23 ♀ ♀ (including holotype taken in June 1954) and 6 ♂ ♂ (including allotype taken in April 1954), under fallen leaves.

Erkosothrips bucca, sp. nov.

See description of preceding species, *silvaticus*, for diagnostic characters.

♀ (brachypterous).—Length about 1.2 mm. (fully distended, 1.5 mm.). Color yellowish brown, darker in thorax and in abdominal segments III-VII, with dark antecostal lines followed by a faint dark cloud on III-VIII; legs yellow, paler than body; antennae about concolorous with body, III somewhat paler and yellow in pedicel. Head 178, across eyes 123, just behind eyes 107, across cheeks 140, near base 120, across basal collar 121, across head-process 74; cheeks swollen, evenly arched; surface polygonally reticulate throughout, more finely in ocellar area, reticles at middle transverse, cheeks serrate; postocular setae 44, expanded at tip, nearly straight, 89 apart, 18 from eyes; occipital setae 24, very slender; eyes 37, width 32, interval 59, very coarsely faceted, about three facets in lateral profile. Antennal segments: I 34 (36), II 44 (30), III 50 (30), IV 44 (30), V 47 (27), VI 46 (24), VII 40 (20), VIII 41 (13); sensicones on III 1 (2), IV 1 (2); all antennal setae pointed. Prothorax 110, across coxae 249; pronotum striate along posterior margin, reticulostriate elsewhere, subrugose near anterior angles; antero-marginal setae 20, very slender and pointed, antero-angulars 44, midlaterals 33, epimerals 55, postero-marginals 57, coxals 31, all of these last strong, straight, and dilated at tip; mesothorax 217 across anterior angles; metathorax without well differentiated pelta, polygonally reticulate throughout; fore tarsi with a small tooth. Abdomen 318 at segment IV; median tergite of I almost semicircular, reticulate throughout; following terga sculptured excepting along posterior margin, reticulate but only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 119, across base 72, at tip 33, sides not thickened, straight, surface smooth, terminal setae 67; other setae long, straight, nearly all dilated at tip, I on IX 106 and dilated, II 110 and dull.

♂ (brachypterous).—Like ♀ in color and general structure; glandular area at middle of sternum VIII very small, circular, about 23 in diameter.

BRAZIL: Nova Teutonia, S. C., April 1954, Fritz Plaumann, 6 ♀ ♀ (including holotype) and 3 ♂ ♂ (including allotype), under fallen leaves.

Eschatothrips cerinus, sp. nov.

Separable from the other Brazilian species of the genus by the pale color, yellow second antennal segment, minute and pointed occipital setae,

and the form of the last antennal segment, which is not distinctly narrowed at base, its breadth at that point (12) nearly equal to its greatest breadth (13).

♀ (macropterous).—Length about 1.7 mm. (fully distended, 1.9 mm.). Color deep golden yellow, slightly shaded along sides of thorax; abdomen with the usual median dark cloud behind antecostal line of segments III-VIII; tube yellow, with apical fifth dark blackish brown; legs concolorous with body; fore wings light brown, with a narrow median streak near middle; antennae yellow in segments I-III, II darkest, IV largely yellow, shaded apically, V darker than III, yellow in pedicel, VI-VIII successively darker, pedicel of VI yellow. Head 218, across eyes 160, just behind eyes 137, across cheeks 163, near base 149, across basal collar 151, across head-process 93, broadest posteriorly; cheeks serrate, gently rounded to a tooth behind eyes, more abruptly rounded to near base; surface strongly polygonally reticulate, more finely at sides of ocellar area; postocular setae 30, slightly curved, somewhat broadened at tip, 136 apart, 30 from eyes; eyes 60, width 35, interval 90, coarsely faceted. Antennal segments: I 47 (43), II 58 (36), III 64 (36), IV 60 (33), V 63 (30), VI 56 (26), VII 43 (20), VIII 41 (13); sense-cones on III 1 (1-2), IV 2 (2); most of dorsal setae on II-V slightly expanded at tip. Prothorax 110, across coxae 294; pronotum reticulate throughout, the reticles along posterior margin mucronate; antero-marginal setae wanting, antero-angulars and midlaterals 19-20, epimerals 70, postero-marginals 29, epimerals much heavier than the others, all blunt and curved, coxals minute and pointed; mesothorax 294 across anterior angles; metanotal pelta reticulate to posterior margin of sclerite; fore tarsi unarmed; fore wings 823, subbasal setae minute. Abdomen 329 at segment II; median tergite of I with anterior portion rectangular and reticulate; following terga sculptured excepting along posterior margin, reticulate but only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 223, across base 93, at tip 39, sides thickened, roundly converging to slightly constricted tip, surface lightly hexagonally reticulate to near tip, lightly ridged, terminal setae 107; other setae mostly rounded at tip, those on basal segments small or minute, I on IX 96-107 and with tip rounded, II 168 and with slender pointed tip.

BRAZIL: Nova Teutonia, S. C., August 1955, Fritz Plaumann, 1 ♀ (holotype), under fallen leaves.

***Eschatothrips decoratus*, sp. nov.**

Separable from the other Brazilian species of the genus by the dark color, yellow second antennal segment, minute and pointed occipital setae, basally-narrowed last antennal segment, and the relatively long fourth antennal segment.

♀ (macropterous).—Length about 1.6 mm. (fully distended, 1.8 mm.). Color chestnut brown, usually darkest along sides of pterothorax, head yellow in front and with a narrow median pale line, abdomen yellow in segment IX and usually with anterior angles of terga III-VIII yellow, sometimes darkest medially except for a pale whitish yellow spot in posterior half of median fourth of terga II or III-VIII; tube orange yellow, tipped with dark blackish brown; legs yellow, with mid and hind femora and tibiae heavily shaded except at either end, the shading on

hind legs darker; fore wings brown, pale at base, submarginally, and in a narrow line just in front of a dark post-median line in about second fourth; antennae with segment I brownish yellow, II and III yellow, IV and V yellow but shaded in swollen apical portion, V darker than IV, VI yellow in about basal half, its remainder and VII and VIII gray-brown. Head 203, across eyes 159, just behind eyes 143, across cheeks 158, near base 145, across basal collar 147, across head-process 76; cheeks serrate, almost straight posterior to the tooth behind eyes; surface strongly polygonally reticulate, more finely in ocellar area; postocular setae 28, slightly curved, somewhat broadened at tip, 129 apart, 22 from eyes; eyes 70, width 45, interval 69, coarsely faceted. Antennal segments: I 39 (33), II 50 (31), III 63 (27), IV 73 (27), V 73 (25), VI 60 (23), VII 40 (18), VIII 35 (13); sense-cones on III 1 (2), IV 2 (2); most of dorsal setae on II-V slightly expanded at tip. Prothorax 97, across coxae 267; pronotum reticulate throughout, the reticles along posterior margin mucronate; antero-marginal setae wanting, antero-angulars 40, midlaterals 24, epimerals 53, postero-marginals 20, epimerals heavier than the others, all blunt and curved, coxals minute and pointed; mesothorax 284 across anterior angles; metanotal pelta reticulate to posterior margin of sclerite; fore tarsi unarmed; fore wings 833, distal subbasal seta about 52 and somewhat broadened at tip, the others minute. Abdomen 321 at segment II; median tergite of I with anterior portion rectangular and reticulate; following terga sculptured except along posterior margin, reticulate but only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 231, across base 74, at tip 37, sides thickened, nearly parallel in about basal half, thence roundly converging to slightly constricted tip, surface deeply hexagonally reticulate to near tip and heavily ridged, terminal setae 145; other setae mostly rounded or slightly dilated at tip, those on basal segments small or minute, I on IX 79 and slightly dilated at tip, II 182 and with slender pointed tip.

♂ (macropterous).—Like ♀ in color and general structure; glandular area on sternum VIII occupying most of its surface, roundly emarginate at sides.

BRAZIL: Nova Teutonia, S. C., July 1953 to October 1955, Fritz Plau-mann, 35 ♀♀ (including holotype taken in May 1954) and 8 ♂♂ (including allotype taken in May 1953), under fallen leaves.

Apoxythrips, gen. nov.

(*apoxys*, tapering off; *thrips*—in allusion to the tapering abdomen, ending in a long, slender tube)

Allied to *Orthothrips*. Head, thorax, and abdomen polygonally reticulate; abdomen broadest in segment II or III, tapering posteriorly, the tube exceptionally long and slender, longer than head, and four to five times as long as basal width; bases of intermediate abdominal segments not modified at sides. Antennae 8-segmented; segments III and IV each with two apically-dilated setae, III with one sense-cone on either surface. Fore wings slightly curved, without accessory setae, the three subbasal setae all minute. Prothoracic epimeron not fused with notum. Setae reduced in size, the postoculars, antero-angulars, and postero-marginals very small; lateral abdominal setae and seta I on segment IX shorter than subbasal width of tube; seta III on intermediate abdominal segments not

projecting beyond sides of abdomen; posterior pair of wing-retaining setae on III-VI only slightly farther apart than their distance from sides of abdomen; seta I on these segments much closer to the wing-retaining setae than to sides of abdomen.

Type species: *Apoxythrips stilifer*, sp. nov.

***Apoxythrips stilifer*, sp. nov.**

♀ (macropterous).—Length about 1.8 mm. (nearly fully distended, 2.0 mm.). Color yellowish brown, with head nearly yellow and abdomen paling to nearly yellow in segments VII-IX, the tube dark brown; legs largely brown, with tips of femora and ends of tibiae yellowish, tarsi yellow; fore wings light brown, paler in front of anal lobe, and with a dark post-median streak ending at middle; antennae brown in segments I, II, and VI-VIII (these last darkest), III-V largely yellow, successively more heavily shaded beyond pedicel. Head 220, across eyes 161, behind eyes 148, across cheeks 166, near base 151, across basal collar 155, across head-process 87, its surface strongly reticulate; postocular setae 8, interval 125, distance from eyes 36; eyes 73, width 44, interval 73; mouth-cone normal to group, 56. Antennal segments: I 40 (40), II 50 (32), III 69 (26), IV 70 (27), V 70 (23), VI 60 (22), VII 43 (17), VIII 44 (13); sense-cones on III and IV 1 (1). Prothorax 110, across coxae 290; pronotum distinctly reticulate throughout; epimeral setae heavy, dilated at tip, 47 long, the other setae minute (about 8); mesothorax 329 across anterior angles; metanotal pelta reticulate like head; fore tarsi with a small tooth on inner surface; fore wings 836. Abdomen 356 at segment II, reticulate over most of surface; tube 294, across base 60, at tip 28, terminal setae 101; most setae stout and truncate at tip, III on intermediate segments not projecting beyond sides of abdomen, I on IX 36, II 132, the latter very finely pointed.

♂ (micropterous).—Like ♀ in color and structure; glandular area on sternum VIII of abdomen occupying about one-half the length and 0.7 the width of the segment, its lateral edges emarginate.

BRAZIL: Nova Teutonia, S. C. September and October, 1955, Fritz Plaumann, 3 ♀ ♀ (including holotype taken in September) and 2 ♂ ♂ (including allotype, also taken in September), under fallen leaves.

***Chorithrips*, gen. nov.**

(*choris*, asunder, apart; *thrips*—in allusion to the divided mesonotum)

Allied to *Orthothrips* and *Chamaeothrips*, differing from the former notably in the longitudinally divided mesonotal sclerite and from both in the presence of strong apodemes arising from the anterior margin of the second abdominal sternum. Head, thorax, and abdomen strongly sculptured, mostly by polygonal reticulation; head much longer than wide, broadest across eyes, notched behind them, heavily polygonally reticulate; mouth-cone very short, normal to group, rounded at tip. Antennae either 7- or 8-segmented, terminal segment pedicellate, III and IV with two or more thickened or apically-dilated setae. Prothoracic epimeron not fused with notum. Mesonotum divided medially by a suture. Fore wings slightly curved, without accessory setae on posterior margin, the subbasal setae all minute. Fore tarsi with a sharp triangular tooth on inner surface. Abdomen rounded apically (rather than evenly tapering); bases of intermediate segments not modified at sides; median tergite of I heavily

sclerotized, nearly or quite three times as wide as long, rounded; II with a pair of strong apodemes arising from anterior margin or sternum; tube much shorter than head, thickened, broadest at the two subbasal pores. Setae reduced in size, the postoculars and all of the prothoracics (excepting sometimes the epimerals) very small; lateral abdominal setae and seta I on segment IX shorter than subbasal width of tube; seta III on intermediate abdominal segments not projecting beyond sides of abdomen; posterior pair of wing-retaining setae on III-VII widely separated; seta I on III-VI much closer to the wing-retaining setae than to sides of abdomen.

Type species: *Chorithrips heptatoma*, sp. nov.

***Chorithrips heptatoma*, sp. nov.**

Readily known from *octotoma*, its only congener, by the 7- instead of 8-segmented antennae, and the much shorter epimeral setae on the prothorax.

♀, *forma macroptera*.—Length about 1.9 mm. (slightly distended, 2.0 mm.). Color yellowish brown to nearly yellow, with sides of head and prothorax, and all of pterothorax, darkened; tube brown, but nearly yellow basally and apically; abdominal terga III-VII each with a subrectangular dark gray median spot just behind antecostal line; legs yellow; fore wings light brown; antennae yellow in segments I-III, the following ones successively darker, shaded with brown beyond pedicel. Head 244, across eyes 168, just behind eyes 147, across cheeks 157, near base 134, across basal collar 136, across head-process 92, its surface strongly reticulate; cheeks straight; postocular setae 12, interval 135, distance from eyes 15; eyes 67, width 46, interval 77; mouth-cone normal to group, 42. Antennal segments: I 46 (43), II 53 (33), III 80 (28), IV 70 (28), V 65 (26), VI 57 (23), VII 77 (19), no suture between the morphological seventh and eighth; sense-cones on III 1 (1), IV 1 (2); two apical dorsal setae on III short and blunt. Prothorax 136, across coxae 260, pronotum reticulate throughout; epimeral seta 19, curved, slightly dilated at tip, all others pointed or nearly so, 9-16; mesothorax 276 across anterior angles; metanotal pelta with sides sharply demarcated, reticulate like head; fore tarsi with a small tooth on inner surface; fore wings 878. Abdomen 333 at segment III, polygonally reticulate throughout median tergite of I, in most of II, and in about lateral thirds of III-VII between antecostal line and first pair of wing-retaining setae, median third of III-VIII with cross-striae broken into quadrilaterals, VIII reticulate at sides, IX across base; tube 165, near base 69, at tip 28, terminal setae 70; other setae short, I on most segments blunt, II bluntly pointed, I on IX 35 and slightly dilated, II on IX 66 and pointed.

♀, *forma brachyptera*.—Like macropterous form in almost every particular; wing-pads about attaining middle of tergum II.

BRAZIL: Nova Teutonia, S. C., May 1953 to August 1955, Fritz Plau-mann, 4 macropterous ♀♀ (including holotype taken in September 1954) and 12 brachypterous ♀♀ (including morphotype taken with holotype), under fallen leaves.

***Chorithrips octotoma*, sp. nov.**

Readily known from *heptatoma*, its only congener, by the 8- instead of 7-segmented antennae, and the much longer epimeral setae on the prothorax.

♀ (brachypterous).—Length about 1.6 mm. (fully distended, 1.8 mm.). Color brownish yellow, with pterothorax and tube somewhat more brownish, abdominal terga without median spots, legs concolorous with body; antennae yellow in segments I, II, and most of III, this last darkened with brown in swollen distal portion, IV-VI successively darker and less yellowish, VII and VIII dark blackish brown. Head 217, across eyes 147, just behind eyes 131, across cheeks 143, near base 116, across basal collar 117, across head-process 84, its surface strongly reticulate; cheeks nearly straight in basal four-fifths; postocular setae 22, interval 114, distance from eyes 23; eyes 47, width 38, interval 72; mouth-cone normal to group, 51. Antennal segments: I 44 (37), II 53 (32), III 70 (29), IV 58 (30), V 53 (29), VI 49 (24), VII 36 (19-20), VIII 36 (12); sense-cones on III 1 (1), IV 1 (2); about four apical setae on each of III and IV blunt. Prothorax 123, across coxae 246, pronotum reticulate throughout; epimeral seta 50, curved, slightly dilated at tip, all others (except the vestigial antero-marginals) 13-16 and blunt; mesothorax 245 across anterior angles; metanotal pelta not sharply delimited, reticulate like head; fore tarsi with a moderately strong tooth on inner surface; wing-pads about attaining posterior margin of tergum I. Abdomen 307 at segment II, polygonally reticulate throughout median tergite of I, in most of II, and in about lateral thirds of III-VII between antecostal line and first pair of wing-retaining setae, median third of III-VIII with cross-striae broken into quadrilaterals, VIII reticulate at sides, IX across base; tube 146, near base 67, at tip 24, terminal setae 67; other setae short, I and II blunt, I on IX 43 and slightly dilated, II on IX 80 and truncate.

♂ (brachypterous).—Like female in color and most details of structure; glandular area on sternum VIII occupying about one-half the length of segment at middle, emarginate laterally, not quite attaining lateral margins.

BRAZIL: Rio Caraguatá, Rio Grande do Sul, 1953, Fritz Plaumann, 3 ♀ ♀ (including holotype) and 1 ♂ (allotype), under fallen leaves.

Trypanothrips, gen. nov.

(*trypanon*, a carpenter's tool, a borer; *thrips*—in allusion to the long mouth-cone)

A striking genus, obviously allied to *Rhynchothrips* because of the very long mouth-cone and the general structure; but (1) with the suture bounding sides of pronotum dorsal and continued directly forward nearly to anterior margin, (2) fore coxae (in ♂) with a conspicuous dorso-lateral tooth or keel extending most of the length of the coxae, (3) fore wings abruptly pinched or constricted shortly before middle, (4) tube nearly parallel-sided, (5) terminal setae exceedingly long (more than five times the length of the tube and more than twice as long as width of mesothorax), and (6) postocular and major prothoracic setae short but with broadly-expanded tips, these tips usually constituting about one-half the length of the setae.

Head long, slender, with cheeks nearly parallel; mouth-cone very long, about attaining metasternum; maxillary palpi with very short first segment, the second segment with a terminal seta which is more than twice the length of the palpus itself. Prothorax (in ♂) long; pronotum confined to about middle half of dorsal surface, its lateral limiting sutures dorsal, concave, and extending forward to anterior margin, where its

width is about equal to that of head; fore legs of male moderately enlarged, fore coxae with a dorso-lateral tooth or keel which is higher anteriorly (shaped much like the dorsal fin of a shark), fore tibiae with a tooth on inner surface at apex, fore tarsi with a long, stout tooth; other legs normal. Fore wings constricted at basal third, where their width is about one-half that near base and near apex, the costal margin of this basal third arched forward; posterior margin with accessory hairs near tip. Abdomen with sigmoid wing-retaining setae on segments II-VII, otherwise normal, save for the nearly parallel-sided tube with its extremely long terminal setae, these fully five times the length of the tube, more than three times the length of the long head, and more than twice the width of the mesothorax.

Type species: *Trypanothrips coxalis*, sp. nov.

Trypanothrips coxalis, sp. nov.

♂ (macropterous).—Length about 1.6 mm. (fully distended, 1.9 mm.). Color gray-brown, with red internal pigmentation; abdomen paler basally, shading to dark brown in segment IX, tube dark brown across base and in about apical half, its remainder nearly black; femora about concolorous with body, fore tibiae and tarsi yellow, mid and hind tibiae yellowish at either end and shaded with brown between, their tarsi yellow; fore wings pale yellowish brown; antennae about concolorous with head, segment III yellow in pedicel and dappled with yellow, especially along outer surface, IV much darker than III but yellowish in about basal third. Head long and narrow, its length (211) about 1.5 times the width across eyes (140), width just behind eyes 136, across cheeks 144, in front of basal collar 139, across collar 141; cheeks straight and parallel except where they converge roundly to eyes; dorsal surface narrowly smooth along most of median line, remainder polygonally subreticulate; postocular setae short but unusually stout, broadly dilated at tip, 18 long, 87 apart, and 20 from eyes; eyes 75, about 45 wide and about 50 apart. Antennal segments: I 37 (33), II 55 (28), III 65 (31), IV 70 (31), V 58 (26), VI 58 (23), VII 54 (20), VIII 33 (12); sense-cones short, stout, rounded at tip, III 1 (2), IV 2 (2). Prothorax 220, across coxae 337, across front margin 188; dorsal surface subreticulate in the large lateral plates and narrowly along posterior margin, smooth elsewhere; major setae short, stout, broadly dilated at tip, antero-marginals and midlaterals 10-11, antero angulars and coxals 20, postero-marginals 17, epimerals 28, this last pair with dilated tips about 15 long and 8 wide; armature of fore legs described under the genus; fore wings 686, only 33 wide where narrowed before middle, with seven accessory setae on posterior margin, the subbasal setae short, very stout, and with greatly expanded tips, the third one of these arising just beyond basal fourth of wing. Abdomen 262 at segment III; median tergite of I triangular, lightly reticulate except along posterior margin; tergum II with dark lines of sculpture sloping backwards toward midline, these mucronate and more reticle-like toward sides of segment, median area smooth; III-VII very faintly cross-striate medially, mucronate and reticulate laterally; VIII and IX less distinctly sculptured; tube 127, width near base 46, at middle 37, near tip 38, at tip 37, terminal setae 658 (!); wing-retaining and terminal setae nearly black, all others pale, most of latter with broadly dilated tips, I on I-IX broadly dilated, I on the more basal segments with tip bent medially, that of seta I on IV 26,

I on IX 66 and broadly dilated, III on IX (the large lateral seta) 141 and pointed; sterna without glandular areas.

BRAZIL: Nova Teutonia, S. C., January 1956, Fritz Plaumann, 1 ♂ from dead branches.

***Polypthemothrips bursarius*, sp. nov.**

Like *tibialis* in small size, knobbed postocular and prothoracic setae, pale tibiae, and few accessory hairs on posterior margin of fore wings; but with all femora yellow, cheeks greatly swollen just behind eyes to form a pouch which is almost subangulate, rather than rounded, and eyes without enlarged facets at posterior angles.

♀ (macropterous).—Length about 1.9 mm. (fully distended, 2.1 mm.). Color brownish yellow, paler in all of abdomen; tube yellow, tipped with gray; legs concolorous with body; antennae about concolorous with head in segments I, II, and basal half of III, gray brown beyond, pedicels of IV-VII somewhat darker. Head 280, across eyes 185, greatest width across cheeks (opposite posterior margin of eyes) 224, least width near base 164, across basal collar 167; median line of head elevated and roof-like between postocular setae and base, surface almost perfectly smooth except for a few faint reticles on either side of extreme base; postocular setae 64, nearly straight, knobbed, interval 160, distance from eyes 40; mouth-cone 149, large, heavy, broadly rounded; eyes 65, width 53, interval 80, without enlarged facets posteriorly, evenly rounded. Antennal segments: I 39 (42), II 60 (32), III 63 (37), IV 64 (37), V 54 (31), VI 54 (27), VII + VIII 70 (22); sense-cones on III 1 (2), IV 2 (2). Prothorax 160, across coxae 294; pronotum without sculpture, with a small median lobe on posterior margin; epimeral setae 68, postero-marginals 63, coxals 48, others 31-40, all straight and knobbed; mesothorax 270 across anterior angles; fore wings 812, with about four accessory hairs on posterior margin, the three subbasal setae like prothoracics; pelta of metanotum not differentiated, longitudinally striate at sides of base, setae small and pointed. Abdomen 291 at segment III, surface almost perfectly smooth; tube 135, near base 69, at tip 29, sides very slightly concave, terminal setae 114; other setae moderately long, largey knobbed, I and II on IX pointed, 140 and 131, respectively.

BRAZIL: Rondon, Paraná (near Paraguay border), September, 1952, Fritz Plaumann, 1 ♀ from dead branches.

***Plectrothrips bicuspis*, sp. nov.**

Unique among the New World species in having two stout spurs, instead of one, on the middle tibiae.

♀ (macropterous).—Length about 2.2 mm. (fully distended, 2.7 mm.). Color chestnut brown, yellow in basal part of head, posterior half of metathorax, and segment IX of abdomen, much darkened along sides of pterothorax; tube orange brown; legs bright golden yellow; fore wings pale brownish yellow, slightly paler subbasally; antennae largely brownish yellow, segment I brown basally and yellow across apex, II darkened in pedicel and along inner and outer surfaces, yellow at tip, III-VIII with tip and pedicel yellow, the intervening portion shaded with brown. Head 294, across eyes 196, across slight notch just behind eyes 186, across cheeks at their anterior sixth 196, across the negligible basal collar 182; surface lightly subreticulate across base, almost perfectly smooth else-

where, postocular setae 110, curved forward and finely pointed, 171 apart and 48 from eyes; mouth-cone broadly rounded, extending about 107 beyond posterior dorsal margin of head; eyes 100, width 54, interval 89. Antennal segments: I 54 (57), II 74 (43), III 83 (53), IV 71 (53), V 70 (43), VI 70 (34), VII 70 (26), VIII 76 (18); sense-cones short, conical, slightly granulate, III-V with one, only, on each side of apex. Prothorax 188, across coxae 473; pronotum lightly reticulate along sides and posterior margin, smooth elsewhere, posterior margin straight; epimeral setae 181, coxal 158, both curved and sharply pointed, the other setae small (30-58;); mesothorax 453 across anterior angles; fore wings 1360, with about 20-24 accessory setae on posterior margin; pelta of metanotum not differentiated, surface lightly longitudinally striate in about basal half, the two major setae very long (150) and pointed, about attaining first abdominal segment. Abdomen 412 at segment IV, surface largely lightly subreticulate; tube 207, across basal collar 109, at tip 59, sides nearly straight, terminal setae 165; other setae long, curved, and pointed, I on VI 241, I on IX 210, II on IX only 47 but stout and thorn-like (diameter 8), III on IX 238.

BRAZIL: Rondon, Paraná (near Paraguay border), November, 1952, Fritz Plaumann, 10 ♀♀ (including holotype), from dead branches.

Menothrips, gen. nov.

(*menos*, strength, fierceness; *thrips*—in allusion to the powerful body and well-armed fore legs)

Allied to *Plectrothrips*, *Mastigothrips*, *Priesnerothrips*, etc., the head long (as in the second of these genera), but with the fore legs strongly armed, the fore femora having a prominent tooth on inner lower surface near apex (almost as in *Acanthothrips*), the fore tibiae with two parallel prominences at middle of the morphologically ventral surface and with the tip of outer surface somewhat prolonged, the fore tarsi with a very strong tooth which is about equal in size to the rest of the tarsus, the heavy apical "claw" on outer surface tridentate. Head long, broadest across eyes, not produced in front of latter, cheeks straight, postocular setae arising far behind eyes; eyes much narrower than their interval; ocelli anterior, not elevated on a prominence, the median one in advance of eyes; mouth-cone short, unusually narrow, rounded at tip, labium extending far beyond labrum, maxillary palpi short, stout, two-segmented; antennae 8-segmented, normal to group, stout, segments III-V each with two short, stout sense-cones, these on lower surface. Prothorax massive, normal to group, epimeron and coxa each with a major seta. Legs stout, especially the fore pair, which are armed as noted above; middle tibiae with one stout spur, hind tibiae with two. Wings straight, fore pair with many accessory setae on hind margin and with subbasal setae. Abdomen normal, narrower than prothorax; tube short and strongly sclerotized.

Type species: *Menothrips ebriosus*, sp. nov.

***Menothrips ebriosus*, sp. nov.**

♀ (macropterous).—Length about 2.2 mm. (fully distended, 2.7 mm.). Color chestnut brown, yellowish in basal part of head and in most of pterothorax, much darkened at posterior angles of prothorax and along sides of pterothorax; tube orange brown, but yellow at tip; legs about

concolorous with body, with all trochanters, tibiae, tarsi, and tips of fore femora yellow, the mid and hind tibiae shaded at middle; fore wings brown, paler at base and in a narrow streak behind middle; antennae nearly concolorous with body in their darker portions, segment I darkest, tip of II and all of III golden yellow, IV and V yellowish but darker, VI-VIII dark brown but yellow basally. Head 304, across eyes 183, just behind eyes 170, near basal collar 153, across collar 156, just in front of eyes 122, with a narrow median suture at base, distinctly subreticulate across base, faintly so in a median area from eyes to postocular setae, nearly smooth elsewhere; postocular setae 116 (sometimes only 89), curved forward and dully pointed, 135 apart and 66 from eyes; mouth-cone extending 114 beyond posterior dorsal margin of head, 87 beyond ventral margin, basal width 77; eyes 102, width 50, interval 84. Antennal segments: I 69 (54), II 70 (45), III 53 (56), IV 47 (53), V 47 (41), VI 54 (32), VII 56 (24), VIII 74 (18), III-V (especially III) wine-glass shaped; sense-cones smooth. Prothorax 280, across coxae 433; pronotum smooth except for subreticulation across anterior margin; epimeral seta 120, coxal 103, others minute (18-28), all pointed; mesothorax 351 across anterior angles; fore wings 1110, with about 17 accessory setae on posterior margin; pelta of metanotum not differentiated, surface finely longitudinally striate, the two major setae long (120) and nearly pointed. Abdomen 389 at segment III, surface almost perfectly smooth, except for the lightly subreticulate median tergite of segment I; tube 124, width near base 82, at tip 37, sides slightly convex, terminal setae 178; other setae long, curved, and nearly or quite pointed, I on IX 109, II 100, III 134.

BRAZIL: Rio Caraguatá, Matto Grosso, August, 1953, Fritz Plaumann, 67 ♀♀ (including holotype) from dead branches.

Lonchothrips, gen. nov.

(*lonche*, a spear-head; *thrips*—in allusion to the shape of the projection on the second antennal segment)

Of the form and general appearance of the allied *Chirothripoides*, resembling that genus in most respects, such as the greatly elongated narrow body, the form of the head, and the general structure of the antennae; but differing most noticeably in the absence of tibial spurs on the middle and hind legs, the long process on the second antennal segment, the prolongation of the tip of the tube into a sharp point, and the one-, instead of two-segmented maxillary palpi. Head long, greatly produced in front of eyes, the latter long and closely approaching each other medially; ocelli large, anterior, not elevated on a prominence, the median one in advance of eyes; mouth-cone short, labium broadly rounded, extending far beyond labrum; maxillary palpi one-segmented, as a result of the complete loss of the usual short basal segment; antennae 8-segmented, I long, concave on inner surface for reception of frontal costa (thus paralleling and almost touching its mate), II remarkable in having its base prolonged forward ventrally to tip of III in the form of a heavy triangular flat blade, the remainder of antenna roughly typical of group, except that the pedicels of IV-VIII are very short and barely visible, and that the sense-cones are dorsal or dorso-lateral, with none on inner surface of III. Prothorax very long, consisting of three metamere-like units (!), its surface mostly membranous but with several weakly-defined, inter-

digitating sclerites whose longitudinal inter-striae are continued as lines of stipples in the membranes, the usual sclerites not recognizable, major setae wanting; pterothorax likewise very long. Legs (especially the fore pair) short and stout; "claw" on outer surface of fore tarsi saw-like, with about seven teeth; mid and hind tibiae without enlarged spurs. Wings straight and narrow, the fore pair with accessory setae on posterior margin but without subbasal setae. Abdomen very long and very narrow, without wing-retaining setae and with major setae only on segments I, VIII, IX, and at tip of tube, the more basal terga emarginate at middle of anterior margin; tube remarkable in having ventral surface prolonged to form a stout sharp spine which over-reaches apex.

Type species: *Lonchothrips linearis*, sp. nov.

***Lonchothrips linearis*, sp. nov.**

♀ (macropterous).—Length about 1.6 mm. (fully distended, 1.8 mm.). Color pale yellowish brown, with tube, tibiae, and tarsi paler, and front of head blackish brown; fore wings yellowish gray, with an ill-defined darker median streak except at base and apex; antennae brown, except for the pale yellow second segment and the yellow pedicel of the third. Head 170, across eyes 69, just behind eyes 50, across cheeks (at base of head) 63, length in front of eyes 53, width in front of eyes 49; cheeks membranous from base to eyes, base membranous at middle of dorsum, sclerotized portions very finely longitudinally striate, all setae minute; eyes 73, width 28, interval 13; mouth-cone to tip of labium from posterior dorsal margin of head 68, to tip of labrum 21; maxillary palpi short, one-segmented. Antennal segments: I 50 (maximum longitudinal dimension) (25), II 37 (inclusive of process 80) (22), III 43 (28), IV 32 (33), V 28 (27), VI 25 (23), VII 20 (16), VIII 35 (14); sense-cones short, stout, curved, granulate, III with one on outer surface, IV and V each with two on dorsum near apex, one on either side. Prothorax 196, across coxae 147; pterothorax 363 long; mesothorax 136 wide anteriorly, metathorax 143 wide anteriorly, 125 wide posteriorly; fore wings 700, usually with about six accessory setae; mesonotum very finely longitudinally striate, metanotum similarly striate across base and in about middle third of remainder. Abdomen 119 at segment IV, dorsal surface finely longitudinally striate in segments I-VIII; III-VIII each with a pair of foveae near anterior angles, whose inner anterior margins overhang to form a dark arc; posterior margin of VIII slightly prolonged medially into an obtuse angle; anterior margin of IX with a slight median lobe extending forward under VIII; tube 83 (total ventral length); spine-like process 30, width near base 9; greatest width of tube 53 (at basal fourth of total length), width at distal setae 24, its sides somewhat concave in apical half; terminal setae 61; tergum I with a pair of fine pointed setae (32 long) arising from posterior angles, II-VII with all setae minute, IX with seta I 61, II 73, both pointed.

BRAZIL: Rio Caraguatá, Matto Grosso, August, 1953, Fritz Plaumann, 72 ♀ ♀ (including holotype) from dead branches.

***Preeriella macilenta*, sp. nov.**

Like *minuta* in having 8-segmented antennae, but with tube stouter, head nearly 2.3 times as long as width across eyes, and setae longer.

♀ (macropterous).—Length about 0.9 mm. (fully distended, 1.1 mm.).

Color pale yellow; head brown in front of eyes, lightly shaded at sides near eyes and more deeply yellow across base; prothorax shaded in epimera and mediad of them, pterothorax slightly darkened in anterior angles, femora slightly shaded on the morphologically dorsal surface; fore wings dark gray basally, paler in distal two-thirds, with a narrow pale median streak beyond middle, this bordered posteriorly by a narrow dark line, most of costal hairs with a dark cloud at base; antennae pale yellow in segments I and II, remainder yellowish gray, III somewhat paler and with base yellow. Head 140, across eyes 61, just behind eyes 60, behind middle 50, near base 55, across head-process 42, the cheeks concave posteriorly; surface reticulo-striate posterior to postocular setae, the cheeks thus serrate in this area; postocular setae 59, straight, swollen at tip, interval 27, distance from base of head only 40; anterior pair of genal setae 33, pointed; eyes about 44, normal in form. Antennae thoroughly typical; segment I 19 (20), II 30 (23), III 18 (17), IV 31 (24), V 32 (20), VI 29 (15), VII 17 (10), VIII 19 (6-7). Prothorax 89, across coxae 121; antero-marginal setae 24, antero-angulars 67, epimerals 47, postero-marginals 43, coxals 47, this last pair and the minute midlaterals pointed, the others swollen at tip; mesothorax 115, fore wings 495. Abdomen 122 at segment VI, tube 52, across base 36, at tip 22, terminal setae 111; other setae long, many of them dilated at tip, I on IX 77 and slightly dilated at tip, II 71 and pointed.

BRAZIL: Belém, Pará, July 29, 1951, J.D.H., 1 ♀ (holotype), from dead vines on Papaya trees.

***Preeriella marginata*, sp. nov.**

Like *minuta* in having 8-segmented antennae, but with tube stouter, head about twice as long as width across eyes, and antero-marginal setae minute.

♀ (macropterous).—Length about 0.9 mm. (fully distended, 1.1 mm.). Color uniform pale yellow; head not darkened in front; fore wings dark gray basally, in distal half nearly colorless and with a narrow dark post-median line; antennae pale yellow in segments I and II, remainder pale yellowish gray. Head 107, across eyes 54, just behind eyes 53, behind middle 43-44, near base 49, across head-process 39, the cheeks concave posteriorly; surface very faintly reticulo-striate basally, the cheeks scarcely serrate in this area; postocular setae 38, straight, swollen at tip, interval 25, distance from base of head only 33; anterior pair of genal setae 23, pointed; eyes about 33, normal in form. Antennae thoroughly typical; segment I 17 (20), II 27 (21), III 15 (16), IV 27 (23), V 24 (19), VI 24 (14), VII 15 (8), VIII 17 (5). Prothorax 73, across coxae 120; antero-marginal setae 5, antero-angulars 44, epimerals 37, postero-marginals 30, coxals 40, this last pair and the minute midlaterals pointed, the others swollen at tip; mesothorax 103, fore wings 413. Abdomen 97 at segment V; tube 50, across base 36, at tip 20, terminal setae 84; other setae long, many of them slightly dilated at tip, I on IX 40 and slightly dilated at tip, II 55 and pointed.

BRAZIL: Nova Teutonia, S. C., Fritz Plaumann, November 9-11, 1949, 1 ♀ on *Cedrella*; and December 14, 1949, 4 ♀ ♀ (including holotype) on either *Alchornea* or *Trichilia*.

***Preeriella fumosa*, sp. nov.**

Like *minuta* in having 8-segmented antennae, but with tube stouter,

head about 1.7 as long as width across eyes, and antero-marginal setae large (24).

♀ (macropterous).—Length about 0.8 mm. (fully distended, 1.0 mm.). Color yellow, shaded with brownish gray in all of head, prothorax, along sides of pterothorax, in metanotum, along sides of abdomen, and in most of tube and femora; fore wings dark gray basally, paler in distal two-thirds, with a narrow pale median streak beyond middle, this bordered posteriorly by a narrow dark line, most of costal hairs with a dark cloud at base; antennae pale yellow in segments I-III, remainder yellowish gray, I and III usually very lightly shaded. Head 104, across eyes 62, just behind eyes 61, behind middle 50, near base 51, across head-process 39, the cheeks concave posteriorly; surface very faintly reticulo-striate posterior to postocular setae, the cheeks scarcely serrate in this area; postocular setae 40, straight, swollen at tip, interval 34, distance from base of head only 30; anterior pair of genal setae 17, pointed; eyes (of paratype) 27, width 25, interval 14, normal in form. Antennae thoroughly typical; segment I 15 (19), II 26 (19), III 13 (16), IV 23 (24), V 23 (19), VI 23 (14), VII 15 (8), VIII 19 (5). Prothorax 71, across coxae 122; antero-marginal setae 24, antero-angulars 47, epimerals 37, postero-marginals 34, coxals 36, this last pair and the minute midlaterals pointed, the others swollen at tip; mesothorax 108, fore wings 427. Abdomen 133 at segment V; tube 41, across base 31, at tip 18, terminal setae 68; other setae long, most of them dilated at tip, I on IX 39 and slightly dilated at tip, II 29 and pointed.

BRAZIL: Nova Teutonia, S. C., Fritz Plaumann, May 25, 1949, 7 ♀ ♀ (including holotype) from *Solanum*; October 18-20, 1949, 1 ♀ in capoeira; and May, 1952, 4 ♀ ♀ without further data.

Preeriella discors, sp. nov.

Very different from all other species of the genus in having 7-segmented antennae and a dark blackish brown head.

♀ (macropterous).—Length about 0.9 mm. (fully distended, 1.1 mm.). Color blackish brown in head, brown in prothorax and fore femora, lightly shaded with brown along sides of pterothorax, and with a pair of obscure brown spots at sides of mesonotum, the remainder of body and legs yellow except for the gray-tipped tube; fore wings dark gray basally, paler in distal two-thirds, with a narrow pale median streak beyond middle, this bordered posteriorly by a narrow dark line, most of costal hairs with a dark cloud at base; antennae pale brown in segment I, dull yellow in II and basal third of III, remainder yellowish gray. Head 103, across eyes 63, just behind eyes 62, behind middle 52, near base 50, across basal collar 52, across head-process 40, the cheeks concave posteriorly; surface distinctly reticulo-striate between and posterior to postocular setae, the cheeks distinctly but widely serrate in basal third; postocular setae 43, nearly straight, swollen at tip, interval 35, distance from eyes 13, from base of head 36; anterior pair of genal setae 17, pointed; eyes about 38. Antennae 7-segmented, the reduction from 8 resulting from the union of III and IV; I 15 (19), II 27 (20), III 37 (23-24), IV 23 (17), V 26 (13), VI 17 (8), VII 21 (5). Prothorax 82, across coxae 121; antero-marginal setae 21, antero-angulars 59, epimerals 46-48, postero-marginals 38, coxals 41, this last pair and the minute midlaterals pointed, the others swollen at tip; mesothorax 103 wide, fore wings 462 long, metathorax 109

wide. Abdomen 102 at segment V; tube 49, across base 33, at tip 18, terminal setae 89; other setae all long, many of them knobbed, I and II on IX 56-57, the former pair knobbed.

BRAZIL: Nova Teutonia, S. C., December, 1949, Fritz Plaumann, 1 ♀ (holotype) from *Trichilia* sp.

***Hyidiothrips nanellus*, sp. nov.**

Like *tesselatus* in lacking a pair of strong setae near inner dorsal margin of eyes, but with much shorter head.

♀ (macropterous).—Length about 0.7 mm. (fully distended, 0.9 mm.). Color blackish brown, with red internal pigmentation, tube darker at middle; legs concolorous with body, tarsi and ends of tibiae paler; fore wings dark gray basally, paler in distal two-thirds, with a narrow pale median streak beyond middle, this bordered posteriorly by a narrow dark line, most of costal hairs with a dark cloud at base; antennae yellowish gray-brown in segments I and II, the former segment darker, III-VIII nearly uniform blackish brown. Head 85, across eyes 73, just behind eyes 72, across anterior end of cheeks 74, near base 66, across basal collar 66-67, across head-process 43, the cheeks thus rounded to eyes and concave posteriorly; surface polygonally reticulate with dark lines which are only slightly elevated, the reticles between postocular setae less distinct; postocular setae 44, curved strongly inward, aciculate apically, dilated at tip, interval 64, distance from eyes 7, from base of head 28; eyes about 38, normal in form. Antennae typical of genus; segment I 13 (20), II 23 (21), III 39 (26), its pedicel only 3 wide, IV 24 (19), V 27 (13), VI 16 (6), VII 19 (4). Prothorax 58, across coxae 133; pronotum transversely depressed across middle above a prominent dark apodeme, smooth, reinforced with a dark line along straight posterior margin; antero-marginal setae arising 9-10 behind the margin, 44 long and 60 apart; antero-angulars about 3 behind margin, 46 long and 72 apart, epimerals 36, postero-margins 51, all with dilated, bent, divided tips, coxals 43 but weaker, paler, and pointed; mesothorax 118, metathorax 123, wings 427 long, all normal; metathoracic pelta with elevated reticulated elliptical basal portion. Abdomen 117 at segment V; tube 41, across base 33, at tip 19, sides slightly concave, terminal setae 71; other setae long, most of them dilated at tip, I on IX 72, dilated at tip and heavy, II 63, slightly dilated at tip and slender.

BRAZIL: Nova Teutonia, S. C., November 1955, Fritz Plaumann, 1 ♀ (holotype), from dead branches.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE STATUS OF THE SEMINOLE BAT, *LASIURUS*
SEMINOLUS (RHOADS)

BY WAYNE H. DAVIS

Museum of Natural History, University of Illinois, Urbana

The status of the Seminole bat, *Lasiurus seminolus* (Rhoads) has been thoroughly treated, and ordinarily no further discussion of the subject should be necessary. However, Miller and Kellogg (U. S. Natl. Mus. Bull. 205, p. 105, 1955), and a subsequent worker (Sealander, Amer. Midl. Nat., 56:264, 1956) who apparently follows their treatment, have given the erroneous impression that the animal in question is a subspecies of *Lasiurus borealis* (Müller). Kellogg has since indicated (personal correspondence) that this listing was due to an unfortunate oversight.

Both Barkalow (Jour. Mamm., 29:415, 1948) and Coleman (Jour. Mamm., 31:190, 1950) have presented evidence to show that the Seminole bat is not a geographical race of *L. borealis*. Each of the two species has a definite range, and these ranges overlap broadly. The two species often utilize the same feeding territory, and in some places have been found together throughout the year. No specimen intermediate between the two forms has ever been taken. In view of such evidence, to consider the Seminole bat a race of *L. borealis* would indicate a misunderstanding of the fundamental concepts of species and subspecies.

Since a work as important as Miller and Kellogg has re-introduced an improper nomenclature for this bat, it is essential that the situation once again be brought to the attention of mammalogists.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE STATUS OF *FONTARIA CORIACEA* KOCH AND
OF *POLYDESMUS CORRUGATUS* WOOD: A MOST
REGRETTABLE TANGLE OF NAMES IN THE DIPLO-
PODA (POLYDESMIDA: XYSTODESMIDAE)

By RICHARD L. HOFFMAN

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It has been stated that, next to infallibility, an author's most prized gift is to be able to discover and rectify his own mistakes, as this somewhat ameliorates the situation in the eyes of the culprit, if no one else. Inasmuch as I became guilty, some years ago, of compounding one of the most egregious errors yet committed in the study of American diplopods, I am very grateful to have the opportunity of disclosing and uprooting this particular weed in the field of milliped nomenclature.

More than a century ago (1847) the celebrated student of arachnids and myriapods C. L. Koch described nearly a dozen species of millipeds from North America, including three referred to the genus *Fontaria*. One of these was identified with the earlier *Fontaria virginiensis* (Drury), the other two, *F. coriacea* from Virginia and *F. oblonga* from Pennsylvania, being described as new. Subsequently Koch compiled the material from his 1847 work, the "System der Myriapoden," into a sumptuous volume published in 1863 under the title "Die Myriapoden, getraut nach der Natur abgebildet und beschrieben." This work is largely a reprint of the earlier one, with the omission of classification, and with enlarged and improved illustrations and a few additional species.

Curiously enough, however, the work of Koch was unknown to Horatio C. Wood, the first prominent American student of the Diplopoda. In 1864 Wood himself named several species in *Fontaria* (which he considered a subgenus of *Polydesmus*), namely, *bifidus*, *crassicutis*, *corrugatus*, and *trimaculatus*. A year later, these were all redescribed and illustrated, along with what Wood considered to be *virginiensis*, in his classic monograph of the myriapods of North America.

The species of *Fontaria* named by Koch and Wood coexisted peacefully in the literature for more than twenty years, until they engaged

the attention of Charles H. Bollman. This worker, in attempting to work out the correct identifications of the Kochian species, unwittingly created a confusion of names which has persisted for more than 70 years!

Bollman's first reference to Koch's *Fontaria* species appeared in 1889, in a catalog of the myriapods of Indiana. Under the name *Fontaria coriacea*, he listed Wood's name *corrugatus* as a synonym, and stated that "A comparison of specimens of *corrugata* Wood with Koch's figures and descriptions shows that they are the same. Koch's figures show a broad yellow band along the posterior margin of each segment. This is a character common to the eastern specimens, but rare in the western forms." In the same paper, under the diagnosis of his new species *Fontaria butleriana*, Bollman wrote "It approaches very closely to Koch's figures of *F. virginensis*, and it is probable that he has described this species as *virginensis*."

Bollman's catalog of the North American myriapods, posthumously published in 1893 (U. S. Nat. Mus. Bull. 46), again placed *corrugatus* in the synonymy of *coriacea*, and listed *oblonga* as a valid form, but did not mention the name *virginensis*, *sensu* Koch. In the same volume, however, appeared a short paper entitled "Notes upon the North American Myriapods described by C. L. Koch" in which Bollman discussed all three of the *Fontaria* names.

For *virginensis* we have the following comments: "The specimens Koch has referred to the *Julus virginensis* of Drury do not belong to that species, but seem to be very close, if not identical, with *Fontaria butleriana* Bollman from Indiana. His figures represent a distinct narrow yellow band along the posterior margin of the segments as in the latter species."

Bollman then disposed of *coriacea* as follows: "A valid species of which *Polydesmus corrugatus* Wood is a synonym. His specimens have a yellow band along the posterior margin of the segments as is the case in the eastern specimens of *coriacea*."¹

Koch's *F. oblonga* was regarded as "A valid species belonging to the same group as *castanea*, *tennesseensis*, and *pulchra*, and perhaps closely allied to the latter, from which it is separated by the superior position of the repugnatorial pore. Koch's specimens, as indicated by the color, were probably not full grown."

These remarks so influenced subsequent workers that no one has ever seriously challenged Bollman's views. However, from time to time various misidentifications of "*coriacea*" appeared in the literature, and upon becoming interested in the genus *Apheloria*, into which *coriacea* had been subsequently placed, I felt constrained to publish a redescription of what, on Bollman's authority, appeared to be Koch's *coriacea*. Not at the time, possessing *Die Myriapoden*, I made a somewhat hurried examination of a copy at the U. S. National Museum, when it was noted that the three American species of *Fontaria* were all figured on

¹This reiterated statement is very perplexing. It is difficult to imagine what Bollman had at hand to represent "eastern specimens of *coriacea*" for I have never seen any *Apheloria* material so colored. It seems possible that he actually had no material, and relied upon Wood's notes and illustration of *corrugatus*, which in turn were made from preserved and possibly discolored specimens. What then, is the identity of Bollman's Indiana "*coriacea*" which, by implication of the earlier statement, rarely have a broad yellow transverse band across each tergite? I have so far not located this part of the Bollman Collection at the U. S. National Museum.

the same plate (XXXII) as figures 62-64, and that one of them corresponded closely to what I had come to recognize, from museum specimens and literature accounts, as *Apheloria coriacea*. Subsequently the order of the illustrations and the names became reversed in my mind, and the synonymy proposed by Bollman thereupon seemed to be entirely correct. In 1949 I became his accomplice by publishing a redescription and designating neotypes of "*coriacea*" from eastern Virginia. This was a blunder of no mean proportions, and to those who have followed the matter this far, I can only address the pretext attributed to the late Thomas Barbour, "I was very young when I wrote that paper."

Since that time several events again focussed attention upon the status of *coriacea*. A copy of *Die Myriapoden* was obtained and studied at length; several hundred specimens of *Apheloria* in full color were examined; and, most important, type material of *Polydesmus corrugatus* became available. In the U. S. National Museum are four specimens labeled—probably by O. F. Cook—as types of *corrugatus*, and, if there be any doubt about their status, there are topotypes in the Museum of Comparative Zoology which are identical with the ostensible types.

Let us start at the beginning and examine Koch's accounts and illustrations in *Die Myriapoden*. Figure 62, on Plate XXXII, depicts a large robust xystodesmid about 35 mm long, dorsally brownish-black with red or pink paranota and a narrow yellow stripe on the caudal edge of each tergite. This illustration is of *Fontaria virginiensis* (as identified by Koch) but the animal is clearly what I described in 1949 as *coriacea* and what has been going by that name ever since 1893. The identification on the basis of form and color is corroborated by the text comment which states that "Die Oeffnung der weiblichen [*sic*] Genitalien gross und oval, die Genitalien mit einer langen Zange, die Zangetheile pfriemenförmig und gleich einem Pfropfenzieher gewunden." The phrase "coiled like a corkscrew" is quite a good characterization of the male gonopod of an *Apheloria*!

On the other hand, the figure of *F. coriacea* (fig. 63) shows a smaller species, in which the dorsum is blackish, and ornamented with very broad yellowish bands which appear to occupy most of the metatergites and expand laterally upon the paranota. This coloration does not correspond to that of any species of *Apheloria* known to me, nor to any xystodesmid occurring in the Atlantic Coast region except that which I named some years ago as *Zinaria rubrilata*, so named because of the very wide chestnut colored stripes across the tergites. Unfortunately, Koch's description must have been made from a female specimen, for he made no mention whatever of "Genitalien." It seems premature to identify the name *coriacea* with one of our established species at this time, but there can be no doubt that the name is *not* a senior synonym of *corrugatus* Wood or of any other known form of *Apheloria*. Probably it might best be placed on the list of *nomina dubia* for the time being. It is a matter of regret that the location of Koch's myriapod material is unknown. My colleagues C. A. W. Jeekel and Otto Kraus have been unable to locate any definite information on the matter.

As the matter now stands, *Fontaria virginiensis* Koch 1847 (*nec* Drury 1770) seems clearly to be the oldest name definitely based upon a species of *Apheloria*. Yet, as it is preoccupied, it falls as a junior

objective homonym of *Fontaria virginensis* (Drury), a combination which dates from the use of J. E. Gray in 1832. Since *Fontaria coriacea* Koch is here considered to be not a species of *Apheloria*, it follows that the first valid name based upon a member of that genus is Wood's *corrugatus*, erected in 1864 for the large, widespread species of eastern United States ornamented with reddish paranota and yellow crossbands. The combination *Apheloria corrugata* has in fact already been established by Count von Attems (1938, *Das Tierreich*, 69:170), although Attems did not explain his usage. Perhaps his line of reasoning paralleled mine as outlined above.

Although I am unable to understand Bollman's statement that the broad yellow bands shown for *coriacea* are "... common to the eastern specimens but rare in the western forms . . .," I am in complete accord with his comment that *Fontaria butleriana* approaches very closely to Koch's figures of *F. virginensis*. I have seen the types of *butleriana* in the National Museum, and regard them as representative of a mid-western subspecies of *corrugata* in which the red pigment of the paranota is replaced by yellow which occupies a smaller portion of the surface than in the nominate form.

The correct name and skeleton synonymy for the typical subspecies of northeastern United States is as follows:

Apheloria corrugata corrugata (Wood)²

Fontaria virginensis (nec Drury 1797) Koch, 1847, *Syst. der Myriapoden*, p. 141; 1863, *Die Myriapoden*, p. 71, pl. 32, fig. 62 (type locality: North America).

Polydesmus corrugatus Wood, 1864, *Proc. Acad. Nat. Sci. Philadelphia*, vol. 6, p. 6; 1865, *Trans. American Philos. Soc.*, vol. 13, p. 222, fig. 50, 51.

Fontaria coriacea (nec Koch 1847) Bollman, 1889, *Proc. U. S. Nat. Mus.*, vol. 11, p. 406; 1893, *Bull. U. S. Nat. Mus.*, No. 46, p. 123, 152.

Apheloria coriacea Loomis, 1939, *Bull. Mus. Comp. Zool.*, vol. 86, p. 193; Hoffman, 1949, *Amer. Mus. Nov.*, No. 1405, pp. 1-8, figs. 1-4.

Apheloria corrugata Attems, 1938, *Das Tierreich*, lief. 69, p. 170.

Apheloria adela Chamberlin, 1939, *Bull. Univ. Utah, biol. ser.*, vol. 5, No. 3, p. 10, fig. 34 (type locality: Ithaca, New York); Hoffman, 1949, *Proc. U. S. Nat. Mus.*, vol. 99, p. 372; Causey, 1955, *Proc. Biol. Soc. Washington*, vol. 68, p. 25.

Type specimens.—Four specimens (U.S.N.M. No. 2303) labeled "types" are probably part of the Wood Collection which is largely at the Academy of Natural Sciences of Philadelphia. Several other millipeds, indicated as Wood's types, have recently been discovered at Washington, and it is known that Cook had borrowed parts of the Academy's milliped collection in the 1890's. In the original description Wood cited "Michigan" and Trenton Falls, New York, as localities for the species, and of these two the latter is selected for the type locality since it is unlikely that the typical subspecies as conceived on the basis of the type material extends as far west as Michigan.

Diagnosis.—*A. corrugata* belongs in the typical section of the genus

²*Fontaria butleriana* Bollman 1889 and *Apheloria virginia* Chamberlain 1939 are regarded as recognizable subspecies, occurring respectively in the Ohio-Indiana-Kentucky region and in south central Virginia.

with *montana* (Bollman), the generotype, the two having almost identical gonopods. The coloration, however, is very characteristic, there being no other American xystodesmid known to me in which the paranota are brilliantly reddish-pink with a narrow lemon yellow strip on the caudal margin of the tergites. This color pattern is stable over the entire Appalachian region from New England to southern Virginia, but at the southwest and western edges of the range *corrugata* modifies its coloration into the patterns which represent the subspecies *butleriana* and *virginia*.

Synonymy.—The status of *virginiensis* Koch has already been discussed. I have seen a considerable number of living and preserved specimens from Ithaca, New York, the type locality of *A. adela*, and can find no characters of structure or coloration by which that local population differs from the rest of the population at large. The Virginia specimens which I tentatively referred to *adela* in 1949 have since been found to be intergrades between *corrugata* and *butleriana*, and I presume this to be the status of the material recorded from West Virginia by Causey (1955) as *adela*. These specimens are usually smaller than typical *corrugata*, and the red color of the paranota is greatly reduced and partly replaced with yellow. This sort of milliped is found in the Appalachian Plateau region from southwestern Virginia north to western Pennsylvania. Further to the west it merges into the all-yellow ornamentation of *A. c. butleriana*.

Distribution.—From southern Virginia (Nansemond, Surry, Campbell, and Bland counties) north through the Appalachians and Coastal Plain at least to the upper Adirondack region and adjacent parts of New England. The northern limits of the range are still poorly known.

Summary

C. H. Bollman (1889) established the synonymy of *Fontaria coriacea* Koch 1847 and *Polydesmus* (*Fontaria*) *corrugatus* Wood 1864, an association which has been accepted by virtually all subsequent workers.

However, it seems apparent, on the basis of material determined as *corrugatus* by direct comparison with the original types of Wood, that those two names are *not* synonyms. Bollman did not mention the locality of the specimens which he regarded as *corrugatus* and which were said to match Koch's figure of *coriacea*; and I have never seen any material of *Apheloria* which does.

The species described by Koch under the name *Fontaria virginiensis* is not conspecific with *Fontaria virginiensis* (Drury), thereby becoming a junior primary homonym, but it is conspecific with that described by Wood as *corrugatus* and identified by Bollman as *coriacea*.

Fontaria coriacea Koch is herewith considered unidentifiable at the present; it is certainly not a species of *Fontaria* Gray (generotype: *Julus virginiensis* Drury) in the strict sense, nor of *Apheloria* Chamberlin (generotype: *Fontaria montana* Bollman).

Therefore, *Polydesmus corrugatus* is resurrected from its unwarranted relegation to synonymy, and restored as the correct name for the most abundant and widespread species of *Apheloria* in eastern North America.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

AN INNOMINATE LAUGHING-THRUSH (*GARRULAX*)
OF NORTHWESTERN YUNNAN

BY H. G. DEIGNAN¹

Vaurie (Amer. Mus. Novit., No. 1669, 1954, p. 6) has recently dealt with the Chinese races of *Garrulax cineraceus*, accepting the name *styani* Oustalet for the race of northwestern Yunnan (*terra restricta*: Tzeku) and *cinereiceps* Styan for the one of the Yangtze Valley, thus following the missteps of Hartert (Vögel der paläarkt. Fauna, hfa. 5, 1909, pp. 630-631), Rothschild (Novit. Zool., vol. 33, 1926, pp. 264-265), and Birkhead (Amer. Mus. Novit., No. 966, 1937, pp. 10-11). Unfortunately, no one of these authors seems to have studied carefully Oustalet's remarks at the first appearance of the name *styani*, or their treatment must have been quite different.

Oustalet (Bull. Mus. Hist. Nat. [Paris], tome 4, 1898, pp. 224-226) begins by giving the history of Styan's type of *cinereiceps* and follows with a meticulous description of the form, drawn from Styan's diagnosis and colored plate. Next, he refers to four specimens coming from Tatsienlu and three others earlier sent from Tzeku, which differed in a number of particulars from *cinereiceps*, and these differences are detailed. He emphasizes that, in these birds, "le sommet de la tête n'est ni gris, ni gris brunâtre, mais d'un brun olivâtre fortement maculé de noir, ou même, chez quatre individus, d'un noir franc, et qui dessine une véritable calotte, nettement délimitée, sauf vers la nuque où elle se fond, pour ainsi dire, en petites taches disséminées." (Italics are Oustalet's.)

In the next paragraph he continues: "Ces différences de coloration et de dimensions jointes à la différence de provenance sont-elles suffisantes pour motiver une distinction spécifique? J'hésite à le croire, d'autant plus que MM. C.-B. Rickett et J.-D. de la Touche disent que, parmi les *Trochalopteron cinereiceps* qu'ils ont obtenus à Ching Feng Ling, à 100 milles au Nord-Ouest de Fou-tchéou, . . . il y avait un spécimen chez lequel la tête était couverte d'une calotte d'un noir presque uniforme. À côté de cet individu, d'autres exemplaires, en petit nombre, avaient le vertex d'un gris foncé, avec des marques noires au centre des plumes, et beaucoup d'autres avaient le dessus du vertex d'un brun grisâtre, à peine plus foncé que la teinte du manteau."

Continuing, he proves that *Trochalopteron ningpoense* David and Oustalet, 1890, can only be the same as *Trochalopteron cinereiceps*, which is sympatric with *ningpoense* in Chekiang.

¹Published with permission of the Secretary of the Smithsonian Institution.

Summing up, and assuming that the differences are due to differences of season, age, or sex, Oustalet shows that the range of *cinereiceps* must now be broadened to cover Fukien, Chekiang, Szechwan, Yunnan, and "probablement . . . les provinces intermédiaires," in which case one need no longer doubt the word of the Chinese dealer from whom Styan obtained his type specimen. "Mais alors, sous quel nom conviendrait-il de désigner un *Trochalopteron* aussi largement répandu? Évidemment, le nom de *Trochalopteron ningpoense* disparaîtrait devant celui de *Trochalopteron cinereiceps* qui aurait la priorité. Mais conviendrait-il alors d'appeler *Trochalopteron* à tête grise un Oiseau chez lequel le sommet de la tête serait d'un noir franc dans la livrée de noces, et d'un brun olivâtre, mélangé de noir et tirant à peine au gris, dans la plumage de transition? Je proposerai dans ce cas de le désigner plutôt sous le nom de *Trochalopteron styani*, en l'honneur du naturaliste anglais qui, le premier, a fait connaître l'espèce."

Somewhat later (*ibid.*, pp. 253-255), Oustalet returns to his subject. Here he says: "*Trochalopteron styani*. Sous ce nom j'ai proposé de désigner l'espèce décrite par M. Styan sous le nom de *Trochalopteron cinereiceps*, dans le cas où il serait reconnu que certains *Trochalopteron* à tête noire du Setchuan et du Yun-nan ne représenteraient que la forme adulte et en plumage de noces des *Trochalopteron* à tête grise étudiés par M. Styan. L'étude que j'ai pu faire de trois nouveaux exemplaires envoyés de Tsé-Kou par le R. P. Soulié . . . n'a fait que me confirmer dans l'idée que j'avais émise de l'identité spécifique de tous ces Oiseaux." There follows a discussion of the great variability of the several characters, and the near relationship of *cineraceus* of Manipur is pointed out.

It seems obvious that Oustalet, who was *not* working with trinomials in these papers, considered the black-headed birds of Yunnan merely representative of the nuptial plumage of the bird earlier named *cinereiceps*, and renamed Styan's *cinereiceps* because the name was hardly applicable to a species in which the crown was more often black or olivaceous brown than gray; in short, *styani* is a mere substitute name for *cinereiceps*. That the name cannot be fixed upon the Yunnan specimens is made perfectly certain by Oustalet's remarks on page 253, quoted in the preceding paragraph.

Mr. R. W. Sims has recently examined for me the type specimen of *cinereiceps* in London and reports that it is in fact representative of the race of the Yangtze Valley, "being fairly close to specimens taken at Ichang from among other Yangtze localities. It is readily distinguished from birds from Yunnan (Lichiang Range) by the grey crown, rufous ear-coverts, chesnut supraocular stripes and comparatively little black speckling along both sides of the throat and extending up to the gape."

If *cinereiceps* (with synonyms *ningpoensis* and *styani*) is the bird of the Yangtze Valley, the form of northwestern Yunnan ("*styani*" auctorum) is left without any available name, and I shall call it

Garrulax cineraceus strenuus, subsp. nov.

Type: U. S. Nat. Mus. No. 296779, adult male, collected in the Tschung Mountains (Mekong Valley), northwestern Yunnan, in November 1923, by Joseph F. C. Rock; original number 1372.

Diagnosis: From *G. c. cinereiceps* of the Yangtze Valley readily separable in *adult* plumage by having the crown and nape distinctly black,

not grayish brown or deep brownish gray, and the supraocular stripe and posterior ear coverts dull olive-brown, not chestnut-rufous.

Range: Northwestern Yunnan and southeastern Hsikang.

Remarks: Vaurie (*loc. cit.*) observes that "authors have failed to realize that *styani* [auctorum] is migratory," and, farther on, "as shown by Schäfer (1938, Jour. Ornith., vol. 86, Sonderh., p. 240), *cinereiceps* is the breeding race at Tatsienlu; *styani* [auctorum] also appears in this region but only as a migrant or visitor outside of the breeding season." Since no member of the extensive genus *Garrulax* has previously been suspected of migration, and since Vaurie's statement implies migration *northward*, one could wish for documentation of the assertion. I suggest that *strenuus* misidentified as *cinereiceps* by Schäfer) is the only form ever found at Tatsienlu [Kangting].

I owe thanks to R. W. Sims of the British Museum (Nat. Hist.) for his examination of the type of Styan's *cinereiceps*, and to A. L. Rand and Philip Hershkovitz of the Chicago Natural History Museum, S. Dillon Ripley of the Peabody Museum of Natural History (New Haven), and J. C. Greenway of the Museum of Comparative Zoölogy (Cambridge), for comments on my unpublished manuscript.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NECESSARY CORRECTION IN THE
NOMENCLATURE OF WATER-STRIDERS
(HEMIPTERA)

BY CARL J. DRAKE *Smithsonian Institute, Washington, D. C.*

In a recent number of the Proceedings (1957, 70:111), I proposed the name *Tachygonus* as a new genus for the reception of the American water-striders heretofore classified as members of the African genus *Tenagogonus* Stal (1855). Through the kindness of Dr. R. L. Wenzel of the Chicago Museum of Natural History, my attention has been called to the fact that *Tachygonus* is preoccupied by a genus of Coleoptera (*Tachygonus* Schoenherr 1833, Gen. et Sp. Curc. (1):6, 111), and thus is a homonym. On this account I am here substituting the name *Tachygerris*, new name for the Neotropical water-striders which I had previously assigned to to the genus *Tachygonus* Drake (not Schoenherr). The type species of the genus is *Tachygerris adamsoni* (Drake) (desc. as *Tenagogonus*). *Tenagogonus duolineatus* Kuitert is a synonym of *T. adamsoni*. In addition to *adamsoni* the genus *Tachygerris* comprises *T. celocis* (Drake and Harris), *T. opacus* (Champion), *T. quadrilineatus* (Champion) and *T. spinulosus* (Kuitert).

PROCEEDINGS
OF THE
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NEW SPECIES AND RECORDS OF *STRIGIPHILUS*
(PHILOPTERIDAE: MALLOPHAGA)
FROM THAILAND¹

By K. C. EMERSON

Stillwater, Oklahoma

and ROBERT E. ELBEL

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The Mallophaga described and identified in the following notes, except for those indicated as being in the British Museum (NH), were collected in Thailand by R. E. Elbel, H. G. Deignan, and Boonsong Lekagul during the period January 1952 to April 1955. Host identifications were furnished by Mr. Deignan, and are in accordance with the classification to be discussed in his forthcoming Check-list of Birds of Thailand. Skins of the birds from which the lice were collected are now in the U. S. National Museum. Collections were made possible by assistance from the U. S. National Museum and the United States Operations Mission to Thailand. The holotype and allotype of the new species described herein have been deposited in the U. S. National Museum.

Strigiphilus bramae (Qadri)

Eustrigiphilus bramae Qadri, 1935. Z. Parasitenk., 8:236, fig. 8. Type host: *Athene brama* probably *indica* (Franklin).

For comparison with the other forms discussed, illustrations of the male genitalia and outline of the dorsal view of the head of the male have been shown in figures 1 and 6. Specimens collected, in Thailand, from *Athene brama mayri* Deignan were: 21 males and 14 females at

¹This investigation was supported by research grant E-1722 from the National Institute of Allergy and Infectious Diseases of the National Institutes of Health. Public Health Service.

Ban Hua Thanon, Khlong Khlung, Kamphaeng Phet; 16 males and 8 females at Muaklek, Kaeng Khoi, Sara Buri; 9 males and 9 females on Khao Nip Mountain, Lop Buri; 4 males and 4 females at Luk Kae, Tamaka, Kanchanaburi; 2 males and 3 females at Ban Na Nong Thum, Chumphae, Khon Kaen; 2 males and 2 females on Khao Khat Mountain, Paknampho, Nakhon Sawan; 1 male and 1 female on Khao Oerawan Mountain, Lop Buri; 9 males and 6 females at Ban Lat, Ban Kaeng, Phukhieo, Chaiyaphum, and 1 female at Bo Phloi, Latya, Kanchanaburi.

***Strigiphilus ketupae* n. sp.**

Male. Outline of head and dorsal anterior plate of forehead as shown in figure 2. Antennae slender and filiform. Three long setae dorsally in each posterolateral angle of pterothorax. Four long setae medianly on the dorsal posterior margin of pterothorax. Seven long setae slightly posterior to the small thoracic sternal plate. Abdominal tergal plates of segments II-IX divided medianly by a wide clear area. Dorsal chaetotaxy of abdominal segments is: II, 0-10-0; III, 2-10-2; IV, 3-10-3; V, 3-10-3; VI, 3-10-3; VII, 2-8-2; and VIII, 1-0-1. Chaetotaxy of abdominal pleurites is: III, 1 short setae; IV, 1 long setae; V, 3 long setae. VI, 5 long setae; VII and VIII, 4 long setae; and IX, 2 long setae. Abdominal sternal plates undeveloped. One median row of long setae on segments II-VII. Number of setae in each row is: II-8, III-16, IV-18, V-18, VI-18, and VII-2. Dorsally, eight long setae located medianly on segment IX, and 6 long setae medianly on posterior margin of terminal abdominal segment. Ventrally, 6 short setae medianly on segment IX, and 5 long setae slightly posterior to the posterolateral angles of the genital opening. Male genitalia as shown in figure 7.

Female. Similar to the male, except in size and terminal abdominal segments. Undivided tergal plate on abdominal segment IX, possesses 1 long and 2 short setae in each posterolateral angle. Sternal plate on abdominal segment IX, small and divided medianly, with 9 long setae on posterolateral angles.

	Measurements			
	Holotype male		Allotype female	
	Length	Width	Length	Width
Head	0.75mm	0.66mm	0.83mm	0.71mm
Prothorax	0.21	0.44	0.21	0.44
Pterothorax	0.16	0.60	0.20	0.68
Abdomen	1.04	0.82	1.10	0.87
Total	2.16		2.34	

The male genitalia differ only slightly from those found in several species of the genus. The long slender dorsal anterior plate of the forehead is distinctive, and is not found on any other known species.

Type host: *Ketupa zeylonensis leschenaulti* (Temminck).

Type material: Holotype male, allotype female and 51 paratypes collected at Ban Na Nong Thum, Non Han, Chumphae, Khon Kaen, Thailand on October 27, 1953 by Robert E. Elbel and Boonsong Lekagul; and 37 paratypes collected at Huai Yang, Prachuap Khiri Khan, Thailand.

***Strigiphilus siamensis* n. sp.**

Male. Outline of head and dorsal anterior plate of forehead as shown in figure 3. Antennae slender and filiform. Four long setae dorsally in each posterolateral angle of pterothorax. Six long setae medianly on the dorsal posterior margin of pterothorax. Five long setae slightly posterior to the small thoracic sternal plate. Abdominal tergal plates of segments II-IX, divided medianly by a wide clear area. Dorsal chaetotaxy of abdominal segments is II, 1-8-1; III, 1-8-1; IV, 2-10-2; V, 2-10-2; VI, 2-8-2; VII, 2-8-2; and VIII, 1-6-1. Chaetotaxy of abdominal pleurites is: III, 1 short setae; IV, 1 short and 1 long setae; V-VIII, each with 4 long setae; and IX, 2 long setae. Abdominal sternal plates undeveloped, with one median row of long setae on segments II-VII. Number of setae in each row is II-6, III-12, IV-12, V-12, VI-8, and VII-2. Dorsally; 6 long setae medianly on segment IX, and 18 long setae on posterior margin of terminal abdominal segment. Ventrally; segment IX is bare, and possesses 6 long setae slightly posterior to the posterolateral angles of genital opening. Male genitalia as shown in figure 8.

Female. Similar to male except in size and chaetotaxy of terminal abdominal segments. Two rows of short setae on posterior margin of vulva. Five long setae on lateral margins of terminal abdominal segment.

	Measurements			
	Holotype male		Allotype female	
	Length	Width	Length	Width
Head	0.57mm	0.47mm	0.64mm	0.58mm
Prothorax	0.14	0.28	0.14	0.31
Pterothorax	0.14	0.47	0.17	0.52
Abdomen	0.87	0.61	1.21	0.80
Total	1.72		2.16	

This species is closest to *S. bramae* (Q.). In addition to differences in size, the male genitalia are smaller, and the dorsal anterior plate of forehead is considerably longer than in *S. bramae* (Q.).

Type host: *Glaucidium brodiei brodiei* (Burton).

Type material: Holotype male, allotype female and 6 paratypes collected at Ban Muang Khai, Tha Li, Loei, Thailand on January 29, 1955 by Robert E. Elbel.

***Strigiphilus macrogenitalis* n. sp.**

Male. Outline of head and dorsal anterior plate of forehead as shown in figure 4. Antennae filiform, but first segments slightly enlarged. Three long setae dorsally in each posterolateral angle of pterothorax. Four long setae medianly on posterior margin of pterothorax. Five long setae slightly posterior to small thoracic sternal plate. Abdominal tergal plates of segments II-V, divided medianly by wide clear area. Dorsally, chaetotaxy of abdominal segments is: II, 1-6-1; III, 2-6-2; IV, 4-4-4; V, 6-2-6; VI, 6-2-6; VII, 6-2-6; and VIII, 6-2-6. Chaetotaxy of abdominal pleurites is III-IV, each with 1 small setae; V, 2 long setae; VI-VIII, each with 4 long setae; and

XI, 2 long and 1 short setae. Abdominal sternal plates undeveloped. One median row of long setae on segments III-VI. Number of setae in each row is: III-6, IV-8, V-8, and VI-10. Ventrally, terminal abdominal segment with 20 long and numerous short setae irregularly spaced. Dorsally, 20 long setae on posterior margin of terminal abdominal segment, and an irregular row of 26 long setae just anterior thereto. Male genitalia as shown in figure 9.

Female. Similar to male, except for size and terminal abdominal segments. Two irregular rows of short setae on posterior margin of vulva. Eight long setae on lateral margins of terminal abdominal segment.

	Measurements			
	Holotype male		Allotype female	
	Length	Width	Length	Width
Head	0.58mm	0.55mm	0.71mm	0.62mm
Prothorax	0.15	0.36	0.17	0.38
Pterothorax	0.16	0.48	0.20	0.57
Abdomen	0.87	0.70	1.22	0.90
Total	1.76		2.30	

This species is closest to *S. heterogenitalis* n. sp. The genitalia of the two forms are similar, but differ greatly from those of the other known species in the genus. In both forms, the dorsal anterior plate is extremely long and pointed posteriorly, extending rearward beyond the mandibular region. The two forms can best be separated by comparing figures 4 and 5; and 9 and 10.

Type host: *Glaucidium cuculoides brügeli* (Parrot).

Type material: Holotype male, allotype female and 4 paratypes collected at Ban Muang Khai, Tha Li, Loci, Thailand on January 12, 1955 by Robert E. Elbel. Paratypes from the type host are: 3 males and 7 females collected at Ban Lat, Ban Kaeng, Phukhico, Chaiphaphum; 4 males and 4 females collected at Ban Na Nong Thum, Non Han, Chumphae, Khon Kaen; 6 males and 10 females collected at Pang Nam Un, Bun Yun, Nan; 25 males and 32 females collected at Pang La, Lampang; 1 male and 1 female collected at Huai Yang, Prachuap Khiri Khan; 6 males and 10 females collected on Phu Phan Mountain, Sakon Nakhon; 1 male and 1 female collected at Ban Thung Chuak, Salokbat, Khanu, Kamphaeng Phet; 4 males and 7 females collected at Chiang Saen Kao, Chiang Rai; 4 males and 4 females collected at Hin Laem, Tha Khanum, Kanchanaburi; 1 female collected at Khlong Khlung, Kamphaeng Phet; 8 males and 9 females collected at Ban Sang Kho, Khok Phu, Sakon Nakhon; and 3 males and 4 females collected at Ban Khlua Klang, Prachuap Khiri Khan; all localities being in Thailand. The British Museum (NH) has 8 males and 7 females collected off *Glaucidium cuculoides rufescens* Baker at Oating, Assam are also paratypes.

Strigiphilus heterogenitalis n. sp.

Male. Outline of head and dorsal anterior plate of forehead as shown in figure 5. Antennae slender and filiform. Thorax except for

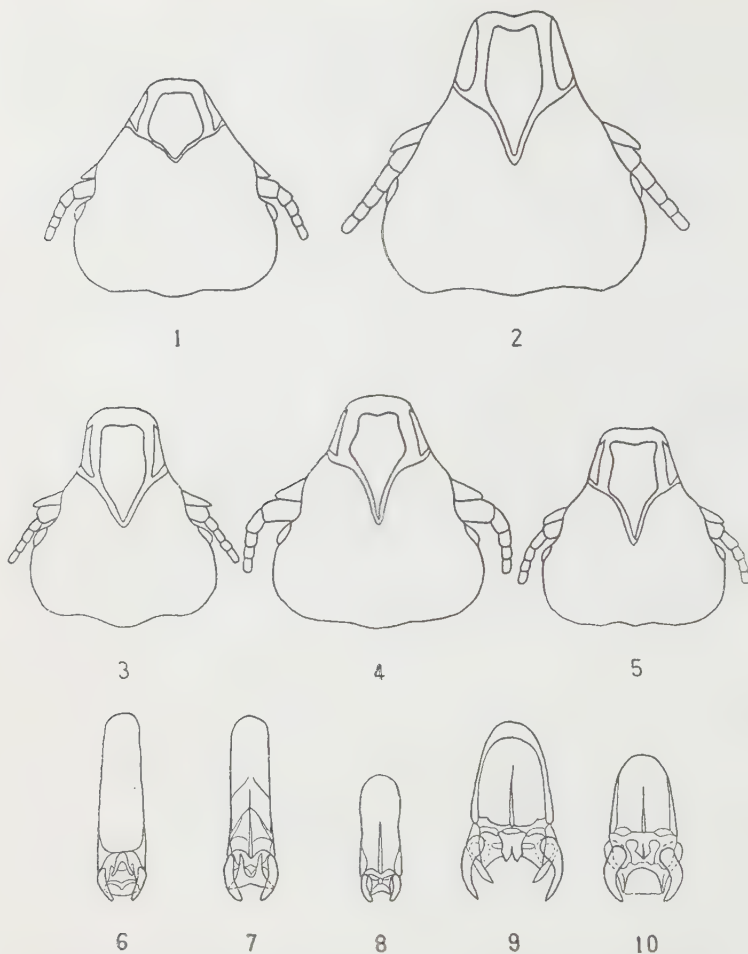
size as in *S. macrogenitalis*. Abdomen, except for size and chaetotaxy of terminal segments, as in *S. macrogenitalis*. Dorsally, terminal abdominal segment with 4 long and 6 short setae on genital flap, and 10 long setae on posterior margin. Ventrally, terminal abdominal segment with 20 long setae, irregularly spaced. Male genitalia as shown in figure 10.

Female. Similar to male, except in size and terminal abdominal segments. Posterior portion of vulva with many irregularly spaced short setae. Eight long setae on lateral margins of terminal abdominal segment.

	Measurements			
	Holotype male		Allotype female	
	Length	Width	Length	Width
Head	0.51mm	0.47mm	0.63mm	0.58mm
Prothorax	0.13	0.30	0.14	0.31
Pterothorax	0.14	0.42	0.16	0.42
Abdomen	0.69	0.57	0.88	0.66
Total	1.47		1.81	

Type host: *Otus bakkamoena lettia* (Hodgson).

Type material: Holotype male, allotype female and 11 paratypes collected at Hin Laem, Tha Khanum, Kanchanaburi on November 20, 1952 by Robert E. Elbel and H. G. Deignan.



Figures 1-5. *Strigiphilus* sp., Outline of head and dorsal anterior plate of forehead, male.

Fig. 1. *S. bramae* (Qadri).

Fig. 2. *S. ketupae* n. sp.

Fig. 3. *S. siamensis* n. sp.

Fig. 4. *S. macrogenitalis* n. sp.

Fig. 5. *S. heterogenitalis* n. sp.

Figures 6-10. *Strigiphilus* sp., male genitalia.

Fig. 6. *S. bramae* (Qadri).

Fig. 7. *S. ketupae* n. sp.

Fig. 8. *S. siamensis* n. sp.

Fig. 9. *S. macrogenitalis* n. sp.

Fig. 10. *S. heterogenitalis* n. sp.

All figures are drawn to the same scale.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE MUD TURTLE, *KINOSTERNON FLAVESCENS*
STEJNEGERI HARTWEG, IN THE UNITED STATES

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During the summer of 1957 we had the opportunity to collect reptiles along the Camino del Diablo and in the vicinity of the Pinacate lava in extreme northern Sonora, Mexico. Although we were primarily concerned with the fauna on the Mexican side of the International Border, we encountered a few noteworthy reptiles in adjacent Arizona. The most notable of these are a male and female mud turtle, clearly referable to *Kinosternon flavescens stejneri* Hartweg.

The two turtles were found *in copula* on July 31, 1957, in the small pond at Quitobaquito, 12 miles west of Sonoyta, Sonora, but on the American side of the Camino del Diablo. The male (Ill. Nat. Hist. Surv.) and female (Mich. State Univ.) have, respectively, carapace lengths of 155 and 142 mm., over-all plastral lengths of 137 and 123 mm., gular lengths of 28 mm., nuchal widths of 8.8 and 4.5 mm., and femoral seam lengths of 11 and 10.2 mm. When the two turtles were alive, the head and soft parts were similar in coloration to those of living *K. f. flavescens*, but the brownish olive shells of the two live *stejneri* were unlike those of any *flavescens* we have seen.

Three subspecies of *Kinosternon flavescens* are currently recognized. The nominate race occurs in the Great Plains from southern Nebraska southward into northern Mexico and from extreme eastern Kansas westward into southeastern Arizona and northeastern Sonora. The race *spooneri* occurs in scattered relict colonies in western Illinois and adjacent Iowa and Missouri. The distinctive *stejneri* has been known previously from Sonora and Durango; presumed intergrades between *flavescens* and *stejneri* have been reported from Jaral, Coahuila (Hartweg, 1938). The subjects of the present paper extend the known range of the subspecies some 160 miles to the northwest and provide the first record of *stejneri* in the United States.

The discovery of aquatic turtles in the tiny, isolated, spring-fed pond at Quitobaquito came as a distinct surprise. The nearest permanent water is the intermittent Sonoyta River which is separated from

Quitobaquito by at least five miles of Sonoran desert. According to the local residents of Sonoyta, mud turtles do occur in the river; and one form, the specifically distinct *Kinosternon sonoriense*, has been recorded from the Sonoyta River (Van Denburgh, 1922). We were unable to find any turtles in the river and thus unable to ascertain if a *flavescens*-type turtle actually does occur in the Rio Sonoyta along with *sonoriense*. In answer to our inquiry concerning other *flavescens* records for the desert portion of Arizona, Dr. Fred A. Shannon of Wickenburg kindly pointed out to us that the only record for western Arizona is one of Agassiz's cotypes of *Platythya flavescens*, said to have been collected in the Gila River at Camp Yuma, Arizona, by R. O. Abbott. The other cotypes were allegedly from Texas and the Red River of Arkansas. The specimen from Yuma is still extant in the United States National Museum, and it is remarkably well preserved for a specimen more than 100 years old. Through the courtesy of Drs. Doris M. Cochran and Remington Kellogg, we have been permitted to examine it.

Expecting that the cotype would prove to be either *sonoriense* or *stejnegeri* as ecological and geographical considerations suggest, we were surprised to learn that it shows more affinities with *flavescens* than any other member of the genus. It is aberrant in some respects, but we regard it as a *flavescens* X *stejnegeri* intergrade. In size of the gular, it resembles the geographically remote *spooneri*; in size of the nuchal, *stejnegeri*; in length of the femoral seam and coloration, *flavescens*. It differs most conspicuously from all members of the *flavescens* group by its more or less quadrangular pectoral laminae (the pectoral seam is 9 mm. in length). The principal diagnostic proportions are summarized for five samples of turtles in the following table.

Sample	Gular length/ lobe of plastron length of anterior		Length of anterior lobe of plastron/gular length + nuchal width + femoral seam length	
	Range	Mean	Range	Mean
<i>K. f. stejnegeri</i> (2 from Arizona)	.600-.640	.620	.984-1.03	1.00
<i>K. f. stejnegeri</i> (9 from Mexico)*	.600-.640	.630	1.07-1.21	1.13
<i>K. f. spooneri</i> (26 from Illinois)	.434-.557	.501	.612-.790	.724
<i>K. f. flavescens</i> (27 from western U.S.)*	.270-.500	.410	.510-.780	.635
Cotype of <i>flavescens</i> (Yuma, Arizona)	---	.478	---	1.25

*Data for the *stejnegeri* sample from Mexico and the *flavescens* sample from western United States taken from Hartweg (1938). The means for the two sexes in each sample have been estimated from the means for each sex presented by Hartweg.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FLORIDOBOLUS, A NEW MILLIPED GENUS
(SPIROBOLIDAE)

BY NELL B. CAUSEY
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A small but notable collection of millipeds from the vicinity of the Archbold Biological Station, Lake Placid, Florida, contains four species representing three genera of the family Spirobolidae. Most of the specimens were collected during June, July, and August, 1957, by Dr. L. R. Penner.

Narceus ramstadi (Chamberlin 1943) is represented by numerous specimens; one collection was made at Highlands Hummock State Park. Several large greenish females that have a width of up to 12.5 mm have been tentatively identified as *Narceus keysi* (Loomis 1944). There is one molting specimen of *Chicobolus spinigerus* (Wood 1864), a species identified from the area earlier (Chamberlin 1951). *Floridobolus penneri*, a new genus and species, which is represented by two specimens, is named for Dr. Penner, who called my attention to the undescribed genus. It is the eleventh species of the family Spirobolidae reported from Florida.

Floridobolus is the fourth genus of the Spirobolidae reported from the United States east of the Rocky Mountains. Species of *Narceus* are found from New York south into Florida and westward into Nebraska, Kansas, Oklahoma, and Texas; species of *Chicobolus* are known from South Carolina, Georgia, Florida, and the Florida Keys; and one species of the Pacific Coast genus *Californibolus* has been collected in Kansas, Nebraska, and Iowa (Causey, 1955). In the following key to these four genera the first sentence in each couplet applies to somatic characters of either sex and the second applies to gonopods and coxal processes of adult males:

1. Ventral margin of mandibular cheeks bears an acute triangular lobe *Narceus* Rafinesque 1820

Ventral margin of mandibular cheeks either rounded or broadly angular, without an acute triangular lobe 2

2. Anal valves compressed and raised along the medial body line. Telopodite of anterior gonopods evenly subuncate at end; telopodite of posterior gonopods with a free inner piece; coxal lobe of seventh legs largest *Chicobolus* Chamberlin 1947

Anal valves not compressed along medial body line. Telopodite of anterior gonopods not evenly subuncate at end; telopodite of

posterior gonopods with inner and outer pieces coalesced; coxal lobe of third legs largest 3

3. Ventral margin of mandibular cheeks rounded. End of telopodite of posterior gonopods divided into several short irregular lobes.

..... *Floridobolus*, new genus

Ventral margin of mandibular cheeks broadly angular. End of telopodite of posterior gonopods acute, not divided into lobes

..... *Californibolus* Verhoeff 1944

Floridobolus, new genus

Diagnosis.—Distinguished especially by the rounded rather than V-shaped apex of the sternum of the anterior gonopods and by the presence of several short lobes on the end of the telopodite of the posterior gonopods. Modification of coxal lobes of anterior legs much as in *Californibolus* and related genera.

Genotype.—*Floridobolus penneri*, new species.

Surface of body shining, very finely punctated. No. scobinae. Ocelli flat, in an irregular patch. Keels of collum acutely narrowed. Apex of caudal segment flattened, shorter than valves, which do not have the medial margins inflated and raised. Third legs of male with coxae produced ventrad in blunt, anteriorly directed, closed uncate processes.

Sternum of anterior gonopods without a ventral medial projection; coxal plates contiguous; telopodites broad, the apical region not uncate. Telopodite of posterior gonopods with inner piece coalesced with outer piece; one of the several short lobes on its apical region with prickles.

Floridobolus penneri, new species

Figures 1-3

Type locality.—Ten miles west of the Archbold Biological Station, U. S. Highway 70, Lake Placid, Highlands Co., Florida, 1 ♂, Aug. 8, 1956; 1 ♂, July 19, 1957; L. R. Penner.

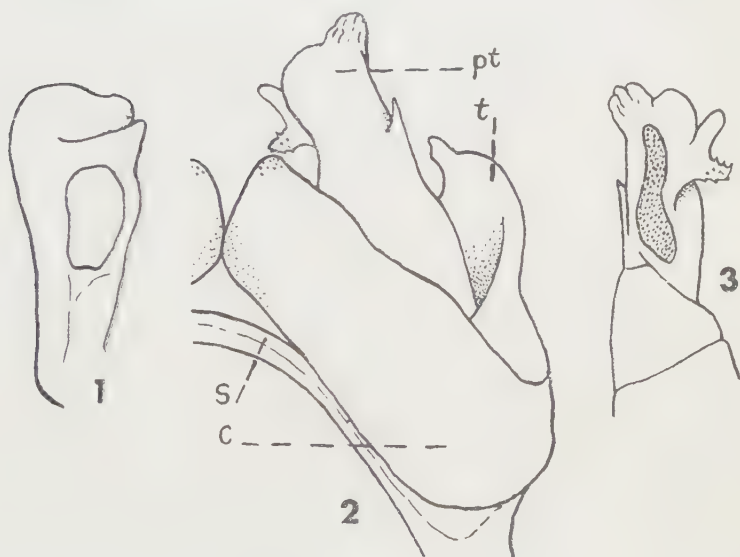
The holotype will be deposited in the American Museum of Natural History and the paratype will be retained in the author's collection.

Description.—Greatest body width 11.6 mm., length about 92 mm., body segments 49 and 50. In alcohol one specimen with black hindbelts, antennae, and legs and brown midbelts; other specimen similar but with greenish tinge. Setigerous labral foveolae 5 + 4 and 6 + 4. Ocelli black, about 65 in 9 curved rows. Ventral margin of mandibular cheeks rounded; mandibular cheeks with shallow antennal furrow. Keels of collum with a submarginal furrow that reaches from the ocelli to the posterior margin; anterior margin of collum slightly concave at level of mandibular cheeks; keels acutely narrowed. Keels of second segment broadly rounded. Segmental furrows continued faintly across dorsum, but not impressed. Hindbelts with minute serrae at ends of ventral striae. Pores in front of and almost touching segmental furrows. Caudal tergite with a slight horizontal depression; apex of tergite rounded, flattened, depressed; ratio of length of caudal tergite to anal valves, as viewed from above, less than 4/1. Anal scale with anterior margin nearly straight.

Coxal lobe of third legs reaches to about the middle of the second

segment of the legs, appearing triangular from a posterior view, but from a lateral view (Figure 1) it is seen to be an anteriorly directed, tightly closed, uncate lobe. Coxal lobe of fourth legs also appearing triangular from a posterior view, but less thickened than the third coxal lobe and not uncate. No other legs with coxal lobes. Second segment of legs with a small rounded protuberance on the distal end of the ventral surface, the protuberances becoming progressively smaller on posterior legs.

Right gonopods appear from an anterior view as shown in figure 2. Sternum of anterior gonopods narrow, the arms long, rounded at the apex, with the triangular area between the sternum and the coxal plates filled by a tough membrane. Telopodite of posterior gonopods (Figures 2, 3) almost straight, about as long as the coxal region, with one acute subterminal process and four short, blunt, terminal lobes, of which one bears prickles; cavity on its posterior surface enclosed by a membrane.



Floridobolus penneri, n. gen., n. sp. Fig. 1. Coxa of left third leg, lateral view. Fig. 2. Right gonopods, anterior view; c- coxal plate, s- sternum, t- telopodite of anterior gonopod; pt- telopodite of posterior gonopod. Fig. 3. Telopodite of right posterior gonopod, posterior view.

PROCEEDINGS
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A NEW SPECIES OF *ELEUTHERODACTYLUS*
(AMPHIBIA: LEPTODACTYLIDAE) FROM CUBA

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Through the auspices of the National Science Foundation, the writer spent the period of June 15 to September 2, 1957, studying the Cuban herpetofauna. The major emphasis of the collections made was upon the Leptodactylid genus *Eleutherodactylus*, and a complete report upon the species of this genus will be made after the study has completed its two year course. However, rather than delay in describing new forms until the monograph is completed, it seems preferable to publish such descriptions promptly. The present paper deals with one such obviously new form.

In a recent paper, I (1957, in press) have summarized the present status of the 26 forms of *Eleutherodactylus* which are known from Cuba. These forms are conveniently, and for the most part correctly, separated into four major groups, which were originally defined by Dunn (1926, p. 210), and I (*op. cit.*) have again defined these groups and have added the forms, described since Dunn's work, in their proper places. Thus, there seems little point in restating these basic premises in the present paper, and the reader is referred to the papers mentioned above.

During the summer of 1957, the first 21 days were spent collecting in the vicinity of San Vicente, Pinar del Río Province, in the company of Messrs. John R. Feick and William H. Gehrmann, Jr.; during parts of the same period I was assisted by Mr. Dennis R. Paulson and Dr. Robert S. Howard. To all these co-workers I wish to express my sincere thanks for their gracious assistance and pleasant company. From San Vicente, several side trips to various other portions of Pinar del Río Province were made. It had been one of our objectives to visit the Cueva de Santo Tomás; this cave system is one of the largest underground systems in Cuba as well as in the New World, having seven and one half miles of explored passages, and its exploration and reconnaissance have been due principally to the efforts of Dr. Antonio Nuñez Jiménez and Ing. Kenneth R. Symington (1955). Ing. Symington agreed to take us to the cave, and a visit was made, under great difficulty because of steady downpour and very inclement weather, on June 22, 1957. The party was made up of Ing. Symington, Messrs. Feick, Gehrmann, Paulson, and myself.

The Cueva de Santo Tomás is located along the southern escarpment of the Sierra de los Organos, 10 kilometers north of the town of Cabezas, Pinar del Río Province. During the dry season it is possible to travel by car on unimproved roads to within a very short distance of the cave mouths, but this is impossible during the rainy season. The Cueva de Santo Tomás is actually a series of three cavern levels, presumably due to successive penetration of the montane mass, locally known as a *mogote*, by the Santo Tomás River. Each of these levels pierces the *mogote* and proceeds independently through it, opening into a small intermontane valley (called locally an *olla*) on one side, and then continuing out the far side of the *olla* through the remaining portion of the outlier. Although the caves penetrate two additional *ollas*, our collecting was limited to the first.

The *olla* is a very steep-sided depression, with access only from the caves; local *guajiros* have recently penned domestic animals in the valley, and these have been introduced down an excessively steep slope at the northwestern end. The maximum length and breadth of the valley are about 500 feet, with the escarpment walls rising to a height of approximately 80 feet. The bases of the walls are buried in much-weathered talus, and the vegetation, composed of deciduous trees and palms, is typical of the *mogote* section of the Sierra de los Organos. The floor of the valley is relatively smooth, somewhat rocky in portions, but principally covered with soil which supports a moderately dense growth of grasses, herbs, and shrubs.

Several species of *Eleutherodactylus* were collected in the *olla*; the weather, which was extremely wet, was especially suitable for the diurnal activity of amphibians. Reptiles did not seem to be particularly abundant, although anoles of several species, *Cadea blanoides*, and *Alsophis angulifer* were taken. Among the frogs collected is one very large individual which represents a new species, as well as being the first member of a group of *Eleutherodactylus* new to the island of Cuba. I take great pleasure in naming this species for my good friend, Ing. Kenneth A. Symington, without whose persistence and fellowship we would never have succeeded in either visiting the Cueva de Santo Tomás, nor of securing the interesting lot of material from western Pinar del Río Province, as

Eleutherodactylus symingtoni, new species

Type: American Museum of Natural History (A.M.N.H.) No. 60801, taken June 22, 1957, under a rock on the side of the first *olla*, Cueva de Santo Tomás, 10 kilometers north of Cabezas, Pinar del Río Province, Cuba, by William H. Gehrmann, Jr. Original number 1799.

Distribution: known only from the type locality.

Diagnosis: A large *Eleutherodactylus* characterized by extremely rugose dorsum, absence of digital discs, short vomerine series, dark brown dorsal and ventral coloration, and orange vermiculations on anterior, dorsal, and posterior surfaces of thighs, and interior surface of crus.

Description of type: An adult male, with the following measurements (all measurements in millimeters): snout-vent length, 61.3; head length (snout to posterior border of tympanum), 24.1; greatest width of head, 26.2; longitudinal diameter of eye, 6.9; longitudinal diameter of

tympanum, 4.4; naris to anterior corner of eye, 8.0; femur, 28.7; tibia, 30.0; length of fourth toe, 27.7. Head slightly broader than distance from snout to posterior border of tympanum; snout somewhat truncate, with nares prominent at anterior end of canthus rostralis; diameter of eye less than distance from naris to anterior corner of eye; interorbital space 7.1, a bit greater than diameter of eye, but roughly comparable; diameter of tympanum less than diameter of eye; distance from tympanum to eye equal to diameter of tympanum; tympanum oval, its vertical diameter greater (5.8) than its horizontal (4.4). Digital discs absent. Fingers slender, unwebbed, 3-4-1-2 in order of decreasing length; subarticular tubercles very well developed. Toes long and slender, unwebbed, 4-3-5-2-1 in order of decreasing length. Heels do not touch when legs are held with femora at right angles to body axis. Dorsum extremely rugose, with rugosities extending from snout, over lores, upperjaw, dorsal surfaces of forelimbs, back, ventrally on sides to a line drawn between insertions of fore- and hindlimbs, dorsal surfaces of thighs, crus, and hindfoot. Throat with many scattered rugosities, stopping at level of forelimb insertions; venter smooth with belly disc feebly developed. Dorsal rugosities largest on head and snout, forming two large and two small tubercles on canthal line, these tubercles stout and truncate; rugosities on remainder of dorsal surfaces of about equal size, more or less regularly spaced, giving a very rough appearance; upper eyelids heavily tuberculate. Posterior and ventral surfaces of thighs covered with large, flattened, pavement-like granules. Tongue oval, possibly slightly mucronate in life, free behind, its greatest width about two-thirds of that of the floor of the mouth. Vomerine teeth in two short, stout, straight series, extending from the inner margin of the choanae medially, separated from each other by a distance slightly less than the length of either of the series, and separated from choanae by a distance equal to the length of either of the series.

Coloration of type (based on color notes taken in the field and on Kodachrome photographs): dorsum dark brown (Pl. 16, A10; color designations from Maerz and Paul, 1950) with black vermiculations and reddish scapular W, outlined in black; a transverse very obscure dusky reddish scapular W, outlined in black; a transverse very obscure ducky yellowish band across dorsum anterior to hindlimbs; one pair of faintly yellow postscapular spots on each side at level of dorsolateral line; anterior, dorsal, and posterior surfaces of thighs brown with dull orange (Pl. 6, 12E) vermiculations, which occur likewise on inner face of crus; an orange V, its apex above vent, extending through groin onto sides for a very short distance, and sending also an orange line posteriorly onto dorsal surface of thigh to become mingled with orange pigment on that member. Dorsal surface of crus with three transverse, poorly defined blackish bands; dorsal surface of foot with two or three poorly defined blackish bands; ground color of crus and foot light brown. Forelimbs with one or two blackish bands on antibrachium, none on brachium; fingers mottled with dark brown and pale tan. Lips spotted with black on dark brown ground color; throat dark brown with scattered small white dots which are tips of rugosities. Venter very dark brown, with many fine white dots, giving a mottled appearance; ventral dots concentrated in groin, which appears mottled, and on sides, with a distinct break between dorsal and ventral pigmentation; ventral surfaces of fore-

and hindlimbs brown mottled with white, the white dots on the hindlimbs larger and more prominent.

Remarks: *E. symingtoni* cannot be placed in any of the known groups (*auriculatus*, *dimidiatus*, *varleyi*, *ricordi*) of Cuban eleutherodactyli. Of these groups, only *auriculatus* and *varleyi* have short vomerine series; however, the *auriculatus* group has well developed digital discs and a rugose belly (both of which *symingtoni* lacks), and *varleyi* is characterized by a pectoral vocal sac in males, and by a dorso-lateral glandular fold and rugose belly as well, all of which characters do not occur in *symingtoni*. Comparison with other members of the genus in Cuba is unnecessary; only *E. greyi* Dunn is known to be equally as large, but this species is a member of the *ricordi* group and no confusion between the two forms should be encountered.

The affinities of *E. symingtoni* with other West Indian members of the genus are unknown. There are no eleutherodactyli on Puerto Rico, Hispaniola, Jamaica, or the Bahamas which display the characters of *symingtoni*, as well as the large size. Certainly its relatives are to be looked for not in the Bahamas (which are inhabited only by *E. ricordi planirostris* Cope and *E. r. rogersi* Goin), nor in Puerto Rico. I am unable to associate *E. symingtoni* with any of the Hispaniolan species, which have been described by Cochran (1941), nor with any of the Jamaican forms, which have been worked by Lynn (1940) and others. It appears that *E. symingtoni* is a species endemic to the Sierra de los Organos in Pinar del Río, and its affinities with other species on the West Indies are unknown. Collections elsewhere in the Sierra de los Organos yielded no additional specimens of this new species, although many other frogs were taken. Since *E. symingtoni* differs so trenchantly from all other Cuban eleutherodactyli, and cannot be placed in any other of the four major groups, it is suggested that this species be made the sole member of the *symingtoni* group. It is hoped that collectors in Pinar del Río will secure additional specimens of this unique species.

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PROCEEDINGS
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A NEW SUBSPECIES OF THE EASTERN
PIPISTRELLE FROM FLORIDA

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During a recent study of the eastern pipistrelle, *Pipistrellus subflavus*, it became evident that there exists in peninsular Florida and southeastern Georgia an undescribed subspecies of this bat.

Many of the specimens used in this study were borrowed and examined at Urbana. I wish to thank the individuals in charge of the collections for the loan of their material. Collections from which specimens were borrowed, and abbreviations used in this paper to designate these collections, are as follows: American Museum of Natural History (AMNH), University of Connecticut (UC), Cornell University (CU), Florida State Board of Health (FSBH), University of Florida (UF), University of Georgia (UG), Museum of Comparative Zoology, Harvard University (MCZ), University of Michigan, Museum of Zoology (UM), H. B. Sherman Collection (HBS), and U. S. National Museum (USNM).

The new race may be named and described as follows:

Pipistrellus subflavus floridanus new subspecies

Type.—Male, adult, skin and skull, no. 163884 American Museum of Natural History; from Homosassa Springs, at head of Homosassa River, Citrus County, Florida; collected on February 9, 1951, by W. Schaldach and J. P. Chapin; original no. 1474.

Range.—Peninsular Florida and southeastern Georgia. Known from as far south as Bassenger, Okeechobee County, Florida, and ranging northward at least to five miles west of Ludowici, Long County, Georgia. This is the pipistrelle found commonly outside the caves in peninsular Florida.

Diagnosis.—A race of *Pipistrellus subflavus* characterized by complete absence of reddish tones to the fur. Color varies from a pale yellow to chocolate brown and silvery-gray. Base of hair brown or black; subterminal band yellowish or gray; terminal band chocolate brown or black; tips of guard hairs silvery. Size large.

Comparisons.—Since the range of this race borders upon only that of *P. s. subflavus*, it needs comparison with that form only. As compared with a series of 24 specimens taken from Waterfall Cave, 7 mi. N Cairo, Grady County, Georgia, on February 5, 1955, *floridanus* differs

markedly in color. The basal band of the hair is similar in the two races. The subterminal band in *subflavus* is a light orange or reddish in color, whereas in *floridanus* it is white to a pale yellow, and lacking entirely in reddish hues. The terminal band is a dark reddish brown in *subflavus*; in *floridanus* this band ranges from brown to black in color. The tips of the guard hairs of *subflavus* are orange in color in contrast to the pale yellow or silver of *floridanus*.

In size *P. s. floridanus* does not differ from *P. s. subflavus* from the Atlantic seaboard, but is slightly larger than those from the Ohio River Valley. Compared with large series (30 or more) from the vicinity of Huntington, West Virginia; Carter Cave, Kentucky; Rosiclare, Illinois; and Adair County Bat Cave, Oklahoma, it is slightly larger in all measurements except length of the toothrow. It is not larger than the average of a large series from the vicinity of Washington, D. C.

Remarks.—Since the type locality of *Pipistrellus subflavus* is known only as Georgia (“de Géorgie”), and two subspecies occur within the state, we are faced with the problem of determining which is the nominal form. In Cuvier’s (1832) original description he states that, “Les parties supérieures du corps sont d’un blond gris clair, légèrement ondulées de brunâtre; les parties inférieures d’un blanc jaunâtre; les poils des parties supérieures sont noirs à leur base, blanchâtres dans la plus grande partie de leur longueur, et brunâtres à leur pointe; . . .”. Although this description seems best to fit that race which inhabits the Okefenokee Swamp (in that the colors of gray, brown, and yellow, but not red, are mentioned), one cannot be sure which form Cuvier has described, since the type has apparently been lost (Rode, 1941, does not list it in the catalogue of types in the National Museum of France). A specimen from the locality from which the type of *P. s. subflavus* most likely came (the LeConte Plantation, 3 mi. SW Riceboro, Liberty County, Georgia; University of Illinois, Museum of Natural History no. 16177; taken by W. L. Jennings, July 4, 1957) more closely resembles the reddish form (*subflavus*) than it does that race found in peninsular Florida (*floridanus*). Unfortunately, the LeConte Plantation seems to be an area of intergradation between the two subspecies.

The race *P. s. floridanus* seems to be partially separated ecologically from *P. s. subflavus*. The former apparently does not inhabit caves. A series of 11 specimens taken from Old Indian Cave, Jackson County, in northwestern Florida, is separable one hundred per cent from *floridanus*. These are typical *subflavus*, and none approaches the color characteristic of *floridanus*. Five of these specimens were taken on May 9, and six on December 11, 1954. Of the 24 specimens taken from Waterfall Cave, which is in extreme southwestern Georgia, in February, only two show any approach to the color of *floridanus*. These two are separable from this race, however, in that they have more reddish tones to the fur than any of the *floridanus* examined.

It would be interesting to study specimens from the caves of Alachua County, Florida, to determine which race occurs there. Pipistrelles are common winter residents in these caves. This is within the range of *floridanus*, which can be found in an active state in winter in the same region. It is quite possible that those wintering in the caves of the southern United States have moved in from the north, and both races might occur in the same region at that time.

The summer range of *floridanus* is not well defined. One specimen shot at Birdsong Plantation, 4 mi. S Beachton, Grady County, Georgia, on May 6, 1954, is typical *subflavus*. This locality is in extreme southwestern Georgia, Only 130 miles from Gulf Hammock, Florida, where *floridanus* is a common permanent resident. Apparently intergradation must take place somewhere between these localities, although the specimen from Birdsong Plantation may have been a transient.

A specimen of a pipistrelle taken from Roswell, Gwinnett County, Georgia, north of Atlanta, and one from St. George Island, St. Marys County, Maryland, are inseparable from *floridanus*. These were the only specimens examined (out of more than 1000) from outside the range of this race which were not recognizable as being distinct and separable. Typical *subflavus* were taken from both localities at the same time. Since both of the above were taken in August, at which time it is known that some birds, and perhaps also bats, wander northward, it could well be that these two specimens are *floridanus*.

Measurements.—Average measurements in millimeters of three adult males from the type locality are: total length 86; length of tail 39; length of foot 9.7; length of ear 13; length of tibia 13; length of forearm 33; length of third metacarpal 32; length of fifth metacarpal 31; greatest length of skull 13.1; zygomatic breadth 7.9; breadth of cranium 6.6; height of cranium 6.0; and alveolar length of maxillary toothrow 4.1.

Specimens examined.—Total number 164, from the following localities: GEORGIA: *Long County*: 5 mi. W Ludowici, 1 (UG); *county unknown*: Okefenokee Swamp, Billy's Island, 5 (CU); Okefenokee Swamp, Chesser's Island, 1 (CU); FLORIDA: *Hamilton County*: 1 (FSBH); *Columbia County*: 4 (FSBH); *Baker County*: 1 (FSBH); *Taylor County*: 6 (FSBH); *Bradford County*: 1 (FSBH); *Clay County*: 6 (FSBH); *Dixie County*: 2 (FSBH); *Gilchrist County*: 1 (FSBH); 4 mi. E Trenton, 2 (UF); *Alachua County*: 30 (FSBH); 8 mi. NW Gainesville, 10 (UF); 2 mi. E Gainesville, 1 (UC); 5 mi. E Gainesville, 5 (HBS), 3 (UF); 6 mi. E Gainesville, 1 (UM); *Putnam County*: 6 (FSBH); *Levy County*: 9 (FSBH); Gulf Hammock, 1 (UF); Waccasassa River, 2 mi. N Gulf Hammock, 2 (AMNH); *Marion County*: 20 (FSBH), Blitche's Ferry, 10 mi. E Ocala, 2 (MCZ); *Citrus County*: 1 (FSBH); Homosassa Springs, at head of Homosassa River, 3 (AMNH); *Sumter County*: 36 (FSBH); *Orange County*: 1 (FSBH); Lake Underhill, Orlando, 1 (USNM); *Pasco County*: 1 (FSBH); *Polk County*: Winterhaven, 1 (UF); *Okeechobee County*: Bassenger, 1 (AMNH).

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INDEX

Volume 70

A

<i>Abies</i>	11, 70
concolor	4, 6, 16, 100
grandis	2, 10
lasiocarpa	13
magnifica shastensis	10, 11, 12
abieticola, Cinora	10, 16
<i>Acanthothrips albivittatus</i>	57
doaneii	57
nodicornis	57
perileucus	57, 58
<i>Acaricoris austeris</i>	36
floridus	35, 36
ignotus	26
<i>Accipiter polioaster</i>	119, 120
<i>achaetis</i> , Phragmothrips	158, 159
adamsoni, Tachygonus	111
adamsoni, Tenagogenus	111
adela, Apheloria	186, 187
advena, Euvelia	116, 117
affinis, Habia rubica	127
agilis, Essigella	71, 72, 73, 88, 109
<i>Aglaocoris clarkae</i>	39, 40
invisus	38, 39, 40
vicinus	134, 135
<i>alarius</i> , Eurythrips	134, 135
albicaulis, Pinus	90
albivittatus, Acanthothrips	57
albus, Sericothrips	51
Alchornea	178
alfaroana, Habia rubica	127
alia, Velia	115, 116
Alsophis angulifer	210
amabilis, Habia rubica	127
americanus, Anoüs minutus	119
Julus	65
Karyothrips	55
<i>amica</i> , Ovatametra	112, 113
<i>ampliventralis</i> , Eurythrips	54
<i>anadenus</i> , Schazothrips	133, 135
<i>Anaphothrips</i> (Prosopoana- photrips) reticulatus	50
secticorvis	50
<i>andesicola</i> , Schenylurus	21, 30
<i>Andropogon</i>	55
virginicus	60
Rhexenor	65, 68
angulifer, Alsophis	210
annularis, Narceus	68
Anoüs minutus americanus	119
stolidus stolidus	119
<i>apache</i> , Neurothrips	58, 59
<i>Apheloria</i>	185, 186, 187
adela	186, 187
coriacea	184, 185, 186
corrugata	184, 185, 186, 187
corrugata butleriana	187
corrugata corrugata	186
virginia	186, 187
Aphididae	1-8, 9-16, 69-100
<i>Apoxythrips stilifer</i>	169, 170
<i>apteris</i> , Sericothrips	50
<i>Arachnothera chrysogenys</i>	
chrysogenys	44
harrissoni	44
<i>Aradidae</i>	35-42

<i>Arctobolus</i>	62, 68
onandaga	68
<i>arkansanus</i> , Glyptothrips	59, 60
armillata armillata, Cyano- lyca	124
armillata, Cyanolyca armil- lata	124
armillatus, Cyanocorax	124
asio lemurum, Otus	43
lempiji, Otus	43
<i>asperatus</i> , Echinothrips	130
<i>Athene brama</i>	195
brama mayri	195
indica	195
atratus transilens, Capito	121
auriculatus, Eleuthrodactylus	212
austeris, Acaricoris	36

B

<i>bachiae</i> , Habia rubica	127
<i>baileyi</i> , Sericothrips	53, 54
<i>bakkamoena</i> lettia, Otus	199
<i>Ballophilus</i>	24
<i>balteatus</i> , Terthrothrips	152
<i>bella</i> , Ovatametra	111, 112, 113
bennetti, Mimon	45, 46
Phyllostoma	46
bicinctus, Terthrothrips	147
bicuspsis, Plectrothrips	174, 175
bifidus, Fontaria	183
Polydesmus	183
<i>Bison bison</i>	31, 32
<i>Blake, S. F.</i>	iv
blancides, Cadae	210
borealis, Lasiurus	181
bourcierii bourcierii, Capito	121
bourcierii, Capito bourcierii	121
bourdellei, Microscilis flavala	44
Bowen, Thomas E.	iv
brachalis, Velia	114
<i>Brady, M. K.</i>	
braggi, Essigella	73, 74, 75, 104, 108
brama, Athene	195
brama mayri, Athene	195
bramae, Eustrigiphilus	195
Strigiphilus	195, 196, 200
Brame, Ardon H., Jr.	iv
<i>brasiliensis</i> , Copiothrips	162, 163
Erythrothrips	129
brevilabiatus, Orphnaeus	26
brevipennis, Scirtothrips	49
brodiei brodiei, Glaucidium	197
brodiei, Glaucidium brodiei	197
brügeli, Glaucidium cucu- loides	198
<i>brunneus</i> , Terthrothrips	148, 149
<i>bucca</i> , Erkosothrips	166, 167, 168
<i>Bucco niger</i>	121
<i>bucculentus</i> , Terthrothrips	145, 146
<i>bullifer</i> , Terthrothrips	149, 150
bungii, Spirobolus	61, 62, 63, 64, 67, 68
bursarius bursarius, Geomys	33, 34
bursarius, Geomys	33, xx
bursarius, Geomys bursarius	33, 34
bursarius, Polyplemothrips	174
bursarius wisconsinensis, Geomys	33, 34

<i>Buteo swainsoni</i>	120	<i>cinereiceps</i> , <i>Garrulax</i>	189, 190, 191
<i>butleriana</i> , <i>Aphelioris</i>		<i>cinereiceps</i> , <i>Garrulax</i>	
<i>corrugata</i>	187	<i>cineraceus</i>	190
<i>Fontaria</i>	184, 186, 187	<i>cinereiceps</i> , <i>Trochalopteron</i>	189, 190, 191
C			
<i>Cadea blanoides</i>	210	<i>cingulatus</i> , <i>Sericothrips</i>	50
<i>Californibolus</i>	205, 206	<i>citricollis</i> , <i>Eurythrips</i>	141
<i>Californibolus</i> <i>Verhoeff</i>	206	claremontiana , <i>Essigella</i>	78, 79, 80, 81, 109
<i>californica</i> , <i>Essigella</i>	75, 76, 77, 78, 79, 81, 85, 88, 90, 97, 99, 100, 101, 107, 109	clarkei , <i>Aglaocoris</i>	39, 40
<i>californicus</i> , <i>Lachnus</i>	69, 70, 85	<i>clivicola</i> , <i>Scirtothrips</i>	49, 50
calinus , <i>Ityphilus</i>	25, 30	<i>coccinea</i> , <i>Habia rubica</i>	126, 127
<i>Callithrichidae</i>	17	cocheta , <i>Essigella</i>	82, 83, 84, 96, 108
<i>Capito atratus transilens</i>	121	<i>collaris</i> , <i>Eurythrips</i>	133
<i>bourcierii</i> <i>bourcierii</i>	121	<i>concolor</i> , <i>Abies</i>	4, 6, 16, 100
<i>niger niger</i>	121	<i>confinis</i> , <i>Habia rubica</i>	127
<i>niger transilens</i>	121	conformis , <i>Eurythrips</i>	136, 137
carens , <i>Terthrothrips</i>	147	<i>conjunctus</i> , <i>Eurythrips</i>	54
<i>caripensis</i> , <i>Myiophobus</i>		<i>contorta</i> , <i>Pinus</i>	75, 90, 93, 105
<i>flavicus</i>	123	Copiothrips	159
carpisha , <i>Schizoribautia</i>	28, 29, 30	<i>brasiliensis</i>	162, 163
<i>castania</i> , <i>Fontaria</i>	184	<i>flaviventris</i>	160, 161
catenatus , <i>Sericothrips</i>	51, 52	<i>fulvescens</i>	159, 161
<i>Causey</i> , <i>Nell B.</i>		<i>fuscifrons</i>	159, 160
Floridobolus , <i>A new milliped genus</i>		<i>subglaber</i>	161, 162
(<i>Spirobolidae</i>)	205-208	<i>ustulatus</i>	162, 163, 164
<i>cayana insulana</i> , <i>Piaya</i>	120	<i>coriacea</i> , <i>Apheloria</i>	184, 185, 186
<i>Cebuella pygmaea</i>	17	<i>Fontaria</i>	183, 184, 185, 186, 187
<i>Cedrella</i>	178	<i>corrugata</i> , <i>Apheloria</i>	184, 185, 186, 187
<i>celocis</i> , <i>Tachygonus</i>	111	<i>Apheloria corrugata</i>	186
<i>centralis</i> , <i>Schizoribautia</i>	27	<i>butleriana</i> , <i>Apheloria</i>	187
<i>Cephalothrips elegans</i>	55	<i>corrugata</i> , <i>Apheloria</i>	186
<i>Cerethmus</i>	25	<i>corrugatus</i> , <i>Fontaria</i>	183, 184, 186, 187
cerinus , <i>Eschatothrips</i>	167, 168	<i>Polydesmus</i>	183-188
<i>Chamaeothrips</i>	170	<i>costalis</i> , <i>Erythrothrips</i>	129
<i>Chamberlin</i> , <i>Ralph V.</i>		<i>costalimai</i> , <i>Eurythrips</i>	136
<i>Geophiloid Chilopods taken in the Northern Andes in 1954-1955</i>	21-30	<i>coulteri</i> , <i>Pinus</i>	85
<i>Chicobolus spinigerus</i>	205	coxalis , <i>Trypanothrips</i>	173, 174
<i>Chilopods</i>	21-30	<i>cozumelae</i> , <i>Mimon</i>	45, 46, 47, 48
chinookiana , <i>Cinara</i>	12, 13, 15	<i>crassicutae</i> , <i>Fontaria</i>	183
<i>Chirothripoides</i>	176	<i>Polydesmus</i>	183
Chorithrips	170, 171	cruralis , <i>Eurythrips</i>	140
<i>heptatoma</i>	171	<i>cuculoides brügelii</i> ,	
<i>octotoma</i>	171, 172	<i>Glaucidium</i>	198
Chortothrips	143, 144	<i>rufescens</i> , <i>Glaucidium</i>	198
<i>Chrotopterus</i>	45, 46	<i>curtithirsuta</i> , <i>Cinara</i>	6, 15, 16
<i>chrysogenys</i> , <i>Arachnothera</i>	44	<i>curvipes</i> , <i>Cinara</i>	3
<i>chrysogenys</i>		<i>curvispinosus</i> , <i>Schizolachnus</i>	14, 15
<i>Arachnothera</i>	44	<i>Cutress</i> , <i>harles E.</i>	iv
<i>chrysothamni</i> , <i>Sericothrips</i>	51	<i>Cyanocorax armillatus</i>	124
Chthonothrips	142, 143	<i>Cyanolyca armillata</i>	124
<i>nigrocinctus</i>	143	D	
<i>Cinara</i>	1, 7, 16, 70, 90	<i>Dalquest</i> , <i>Walter W.</i>	
<i>abieticola</i>	10, 16	<i>American Bats of the Genus Mimon</i>	45-48
<i>chinookiana</i>	12, 13, 15	<i>Davis</i> , <i>Wayne H.</i>	
<i>curtithirsuta</i>	6, 15, 16	<i>The Status of the Seminole Bat, Lasius seminolus (Rhoads)</i>	181-182
<i>curvipes</i>	3	<i>A new subspecies of the Eastern Pipistrelle from Florida</i>	213-216
gentneri	1, 2, 3, 4, 8	<i>davisoni</i> , <i>Microscelis flavala</i>	44
<i>hirsuta</i>	7	decoratus , <i>Eschatothrips</i>	168, 169
<i>klusa</i>	3, 4, 8	defectus , <i>Plemmelothrips</i>	144, 145
moketa	6, 7, 8	<i>Deignan</i> , <i>H. G.</i>	
<i>murrayanae</i>	6	<i>A trio of new birds from tropical Asia</i>	43-44
<i>pinia</i>	7	<i>An innominate laughing-thrush (Garrulax) of Northwestern Yunnan</i>	189-192
<i>rustica</i>	14, 15	dentifer , <i>Schendylurus</i>	21, 22, 23, 30
Schuhi	4, 5, 6, 8	desertorum , <i>Sericothrips</i>	51, 52, 53
<i>setulosa</i>	11, 12, 16	<i>diffidens</i> , <i>Huseyella</i>	117
<i>sonata</i>	9, 10, 11, 16	<i>dimidiatus</i> , <i>Eleutherothrips</i>	212
<i>cinctus</i> , <i>Eurythrips</i>	138		
<i>cineraceus cinereiceps</i>	190		
<i>cineraceus</i> , <i>Garrulax</i>	189		
<i>cineraceus strenuus</i> , <i>Garrula</i>	190, 191		

- Diplethmus 25
 ribauti 24
 discolor, Phyllostomus 46
 discors, Preeriella 179, 180
 divergens, Orthothrips 164, 165
 doaneii, Acanthothrips 57
 douglassi, Pseudotsuga 107
 Drake, Carl J.
 New Apterous Aradidae
 (Hemiptera) 35-42
 New Neotropical Water-
 striders (Hemiptera) 111-118
 A necessary correction in
 the nomenclature of
 water-striders
 (Hemiptera) 193-194
 Drake, Robert J. iv
 dulineatus, Tachygonus 111
 duolineatus, Tachygonus 111
 Duvall, Allen J. iv
- E
- ebriosus, Menothrips 175, 176
 Echinothrips asperatus 130
 subflavus 130
 edulis, Pinus 14, 91, 92, 95
 elegans, Cephalothrips 55
 Eleutherodactylus 209-212
 auriculatus 212
 dimidiatus 212
 greyi 212
 guajiros 210
 mogote 210
 olla 210
 ricordi planirostris 212
 ricordi rogersi 212
 symingtoni 210, 211, 212
 varleyi 212
 elongatus, Eurythrips 140, 141
 Emerson, K. C., and Robert
 E. Elbel
 New species and records
 of *Strigiphilus* (Phil-
 opteridae: Mallophaga)
 from Thailand 195-200
 Emydcoris 37
 testudinatus 38
 Ephedra trifurca 51
 ephedrae, Sericothrips 51
 Eretmocoris insularis 36, 37
 testudinatus 38
 ergo, Spirobolus 62
 Erkosothrips 166
 bucca 166, 167
 silvaticus 166, 167
 Erythrothrips brasiliensis 129
 costalis 129
 loripes 129, 130
 Eschatothrips cerinus 167, 168
 decoratus 168, 169
 Essigella 69-109
 agilis 71, 72, 73, 88, 109
 braggi 73, 74, 75, 104, 108
 Californica 75, 76, 77, 78, 79, 81, 85,
 88, 90, 97, 99, 100, 101, 107, 108
 109
 claremontiana 78, 79, 80, 81, 109
 cocheta 82, 83, 84, 96, 108
 essigi 74, 77, 79, 84, 85, 93, 99, 102,
 103, 104, 106, 109
 fusca 71, 73, 75, 86, 87, 88, 93, 97,
 108
 gillettii 75, 76, 77, 78, 79, 88, 89,
 90, 108
 hoernero 70, 86, 90, 91, 92, 95, 109
 knowltoni 83, 92, 93, 109
 maculata 80, 93, 94, 95, 109
 monelli 83, 84, 95, 96, 108
 palmerae 73, 83, 88, 96, 97, 98, 108
 patchae 76, 77, 80, 81, 98, 99, 100, 109
 pergandei 72, 100, 107, 109
 pineti 72, 101, 102, 109
 pini 69, 76, 81, 92, 93, 99, 102, 103,
 109
 robusta 80, 103, 104, 105
 swaini 74, 105, 106, 109
 wilsoni 74, 77, 96, 100, 106, 107, 108
 essigi, Essigella 74, 77, 79, 84, 85, 93, 99,
 102, 103, 104, 106, 109
 Eulachnina 69
 Eulachnus 69
 Eurythrips 132, 133, 142, 143, 159
 alarius 134, 135
 ampliventralis 54
 cinctus 138
 citrifolius 141
 collaris 133
 conformis 136, 137
 conjunctus 54
 costalimai 136
 cruialis 140
 elongatus 140, 141
 genarum 54, 55
 hemimeres 142
 musivi 137, 138
 nigriceps 141
 occipitalis 139, 140
 peccans 134, 135
 pusillus 135, 136
 striolatus 137, 138
 valens 144
 xanthozonus 138, 139
 Eustrigiphilus bramae 195
 Euvelia advena 116, 117
 exquisitus, Spirobolus 62
- F
- Falco hamatus 119
 poliogaster 119, 120
 fallax, Leucippus 120
 fallax richmondi, Leucippus 120
 fallax, Trochilus 120
 Feinstein, Bernard R. iv
 flava, bourdellei,
 Microscilis 44
 flava, davisoni, Microscilis 44
 flava, Microscilis 44
 flavescens, Glyptothrips 59, 60
 flavescens, Platythya 202
 flavescens stejnegeri,
 Kinosternon 201, 203
 flavicans caripensis,
 Myiophobus 123
 flavicans flavicans,
 Myiophobus 122, 123
 flavicans, Myiophobus
 flavicans 122, 123
 flavicans perianus,
 Myiophobus 122, 123
 flavicans superciliaris,
 Myiophobus 123
 flavicans venezuelans,
 Myiophobus 122, 123
 flaviventris, Copiothrips 160, 161
 flexilis, Pinus 91
 Floridobolus 205, 206, 207, 208
 penneri 205, 206, 207
 floridus, Acaricoris 35, 36
 floridanus, Pipistrellus
 subflavus 213
 Fontaria 183-188
 bifidus 183

Fontaria			
butleriana	184, 186, 187		
castanea	184		
coriacea	183, 184, 185, 186, 187		
corrugatus	183, 184, 186, 187		
crassicutis	183		
montana	187		
oblonga	183, 184		
pulchra	184		
tennesseensis	184		
trimaculatus	183		
virginiensis	183, 184, 185, 186, 187		
forceps, Silista	65		
Franklinothrips vespiformis	53		
Friedmann, Herbert	iv		
fuhmanni, Ribautia	26		
fulvencens, Copiothrips	159, 161		
fumosa, Preeriella	178, 179		
fusca, Ovatametra	113		
fuscatus, Terthrothrips	148		
fuscicollis, Tamarin	18		
fuscifrons, Copiothrips	159, 160		
fuscus, Essigella	71, 73, 75, 86, 87, 88, 93, 97, 108		
fuscus, Leontocebus			
leontocebus	18		
fuscus, Leontopithecus	18		
G			
Garrulax	189-192		
cineraceus	189		
cineraceus cinereiceps	190		
cineraceus strenuus	190, 191		
cinericeps	189, 190, 191		
styani	189		
genarum, Eurythrips	54, 55		
gentneri, Cinara	1, 2, 3, 4, 8		
Geomys	33		
bursarius bursarius	33, 34		
wisconsinensis	33, 34		
Geophilida	21		
Geophiloid Chilopods	21-30		
gillettei, Essigella	75, 76, 77, 78, 79, 88, 89, 90, 108		
Glaucidium brodiei brodiei	197		
cuculoides brügeli	198		
cuculoides rufescens	198		
Glyptothrips arkansanus	59, 60		
flavescens	59, 60		
grandis, Abies	2, 10		
greyi, Eleuthrodactylus	212		
guajiros, Eleuthrodactylus	210		
guianensis, Ityphilus	25		
H			
Habia rubica	126		
Habia rubica affinis	127		
alfaroana	127		
amabilis	127		
bahiae	127		
coccinae	126, 127		
confinis	127		
hesterna	127		
nelsoni	127		
perijana	126, 127		
peruviana	127		
rhodinolaema	127		
rosea	127		
rubica	127		
rubicoides	127		
rubra	127		
vinacea	127		
hamatus, Falco	119		
Helicolestes	119		
Handley, C. O., Jr.	iv		
Harvey, James S.	iv		
habes, Terthrothrips	152, 153		
Helicolestes humatus	119		
hemimeres, Eurythrips	142		
Hemiptera	35-42, 111-118, 193-194		
heptatoma, Chorithrips	171		
Hercothrips	166		
Herre, Albert W.	iv		
Hershkovits, Philip			
The systematic position of the Marmoset, Simia leonina Humboldt (Primates).	17-20		
The type locality of <i>Bison bison</i> Linnaeus	31-32		
hesterna, Habia rubica	127		
heterogenitalis, Strigiphilus	198, 199, 200		
hirsuta, Cinara	7		
hoernerii, Essigella	70, 86, 90, 91, 92, 95, 109		
Hoffman, Richard L.			
Studies on Spiroboloid millipeds. IV. The characters and relationships of the genera <i>Narceus</i> Rafinesque 1820 and <i>Spirobolus</i> Brandt 1833.	61-68		
The status of <i>Fontaria coriacea</i> Koch and of <i>Polydesmus corrugatus</i> Wood; A most regrettable tangle of names in the Diplopoda (Polydesmidae Xystodesmidae)	183-188		
Hood, J. Douglas			
Fifteen new Thysanoptera from the United States.	49-60		
New Brazilian Thysanoptera	129-180		
Hoplandrothrips nasutus	57		
Hottes, F. C.			
Four new species of conifer feeding aphids. Descriptions and figures of the morphotypes of some conifer feeding aphids.	9-16		
A synopsis of the genus <i>Essigella</i> (Aphidae).	69-110		
Husseyella	116		
diffidens	117		
turmalis	117		
Hydiorhrips nanellus	180		
tesse; atis	180		
hylaesus, Orthothrips	165		
I			
ignotus, Acaricoris	36		
illigeri, Leontocebus	18		
impolitus, Terthrothrips	153, 154		
indica, Athene	195		
inquirendum	65		
insulana, Piaya cayana	120		
insularis, Eretomocoris	36		
interruptus, Pseudothrips	131		
inuncatus, Phragmothrips	156, 157, 158		
invisus, Aglaocoris	40		
irretitus, Terthrothrips	150, 151, 153		
Irving, Laurence			
Adaptation of warm-blooded animals to arctic cold	iv		
Ityphilus	25		
calinus	25, 30		
guianensis	25		

- J**
- Jackson, Hartley H. T.
 An unrecognized pocket
 gopher from Wisconsin. 33-34
- joannisii, Spirobolus 62, 67
- Johnson, D. H. iv
- Julus americanus 65
- marginatus 62
- virginiensis 184, 187
- junin, Schizoribautica 28, 29
- K**
- Karnyothrips americanus 55
- medialis 55
- piceus 55, 56
- prolatus 55, 56
- Ketupa zeylonensis lesche-
 naulti 196
- ketupae, Strigiphilus 196, 200
- keyai, Narceus 205
- Kinosternon flavescens
 flavescens 201
- sonoriense 201, 202
- spooneri 201, 202
- stejnegeri 201, 202, 203
- kiusa, Cinara 3, 4, 8
- knowltoni, Essigella 83, 92, 93, 109
- L**
- Lachner, Ernest A. iv
- Lachmini 69
- Lachnus californicus 69, 70, 85
- lagonotus, Tamarin Leonto-
 cebus 18
- lambertiana, Pinus 7
- lasiocarpa, Abies 13
- Lasiurus borealis 181
- seminolus 181
- lempiji, Otus asio 43
- lemurum, Otus asio 43
- leonina, Simia 17, 18, 19
- Leontideus 17
- Leontocebus 17, 18
- fuscicollis 18
- fuscus leontocebus 18
- illigeri 18
- lagonotus, Tamarin 18
- Leontocebus fuscus 18
- weddelli, Tamarin 18
- Leontopithecus fuscus 18
- Lepidium thurberi 54
- Leptopogon minor 123
- rufipectus rufipectus 124
- venezuelans 123, 124
- Leptyniphilus 25
- leschenaulti, Ketupa zelon-
 ensis 196
- lettia, Otus bakkamoena 199
- Leucippus fallax 120
- fallax richmondi 120
- Limnogonus 111
- Limnometra 111
- linearis, Lonchothrips 177
- lomanus, Schendylurus pal-
 lidus 23, 24, 30
- Lonchothrips linearis 176, 177
- longipennis, Scirtothrips 49
- loripes, Erythrothrips 129, 130
- luteolus, Terthrothrips 151, 152
- M**
- macilenta, Preeriella 177, 178
- macrogenitalis,
 Strigiphilus 197, 198, 199, 200
- maculata, Essigella 80, 92, 94, 95, 109
- magnafemoralis, Neurothrips 58
- magnificia shastensis, Abies 10, 11, 12
- majusculus, Phragmothrips 155, 156
- Malocothrips 131, 132, 133
- marginata, Preeriella 178
- marginatus, Julus 62
- Spirobolus 62, 65
- Marikina 17
- Mastigothrips 175
- maximiliana, Notiphilides 25
- mayri, Athene brama 195
- McIntyre, Tom iv
- Mecocerculus minor 123
- medialis, Karynothrips 55
- Megalopterus minutus ameri-
 canus 119
- Menothrips 175
- ebriosus 175, 176
- menziesii, Pseudotsuga 197
- meridensis, Piculus rubigi-
 nosus 122
- mexicanus, Taurus 31
- Micropogon bourcierii 121
- Microscillus flava 44
- flava bourdellei 44
- davisoni 44
- remotum 44
- Mimon 45-48
- bennetti 45, 46
- cozumelae 45, 46, 47, 48
- minor, Leptopogon 123
- Mecocerculus 123
- minuta, Preeriella 177, 178
- minutua americanus, Anoüs 119
- Megalopterus 119
- Mogote, Eleuthrodactylus 210
- moketa, Cinara 6, 7, 8
- Monasa morphoeus peruana 121
- peruana 121
- monelli, Essigella 83, 84, 95, 96, 108
- montana, Fontaria 187
- morphoeus peruana, Monasa 121
- Morrison, J. P. E. iv
- moultoni, Sericothrips 51
- murrayanae, Cinara 6
- myrrayana, Pinus 90
- musini, Eurythrips 137, 138
- Myiophobus flavicus cari-
 pensis 123
- flavicans 122, 123
- perijanus 122, 123
- superciliaris 123
- venezuelans 122, 123
- N**
- nama, Velia 114, 115
- nanellus, Hyidiethropis 180
- Narceus 61, 62, 64, 65, 67, 205
- annularis 68
- keysi 205
- ramstadi 205
- tinctorius 65, 68
- nasutus, Hoplandrothrips 57
- nelsoni, Habia rubica 127
- Neurothrips apache 58, 59
- magnafemoralis 58
- niger, Bucco 121
- Capito niger 121
- niger, Capito 121
- transilens, Capito 121
- nigrescens, Simia 17
- nigriceps, Eurythrips 141
- nigricollis, Tamarin 18
- nigrifrons, Tamarin 18
- nigrifrons, Tamarin 18

nigrocinctus , Chthonothrips	143	Phyllostomus	46, 47
ningpoense, Trochalopteron	189, 190	bennetti	46
nodicornis, Acanthothrips	57	discolor	46
Notiphilides maximiliana	25	Piaya cayana insulana	120
O		piceus , Karnyothrips	55, 56
obesa, Ovatametra	113	Piculus rubiginosus meri-	
oblonga, Fontaria	183, 184	densis	122
occipitalis , Eurythrips	139, 140	paraquensis	122
octotoma , Chorithrips	171, 172	rubiginosus	121, 122
Oedipomidas	17	Picus rubiginosus	121
olfersii, Spirobolus	61	pinca, Cinara	7
Olla, Eleuthrodactylus	210	pineti , Essigella	72, 101, 102, 109
onandaga, Arcetobolus	68	pini, Essigella	69, 76, 81, 92, 93,
opacus, Tachygonus	111	99, 102, 103, 109	
Orphanæus brevilabiatus	26	Pinus	70, 85
Orthothrips	169, 170	albicaulus	90
divergens	164, 165	contorta	75, 90, 93, 105
hylaëus	165	coulteri	85
saltuarius	165, 166	edulis	14, 91, 92, 95
woytkowski	164	flexilis	91
Otus asio lempiji	43	lambertiana	7
asio lemurum	43, 44	murrayana	90
bakkamoëna lettia	199	ponderosa	15, 73, 88, 90, 91, 97,
ovatametra amnica	112, 113	102, 108	
bella	111, 112, 113	radiata	78, 81, 85, 90
fusca	113	sabiniana	106
obesa	113	scopulorum	73
parvula	113	strobis	77, 99, 100
Owens, H. B.	iv	taeda	103
P		tuberculata	85, 96
Packard, Robert L. N.	iv	Pipistrellus subflavus flori-	
pallidipennis , Plesiothrips	54	danus	213
pallidus, Iomanus, Schendylurus	23, 24, 30	planirostris, Eleutherodactylus	212
pallidus, Schendylurus	24	ricordi	202
palmerae , Essigella	73, 83, 88, 96, 97, 98, 108	Platythra flavescens	174, 175
panicus, Trips	54	Plectrothrips bicuspis	144, 145
pantenus , Zygethmus	24, 25, 30	Plemmelothrips defectus	54
Paradiso, J. L.	iv	Plesiothrips pallidipennis	54
paraquensis, Piculus rubiginosus	122	perplexus	132, 133
parvula, Ovatametra	113	Pleurothrips	119, 120
patchae , Essigella	76, 77, 80, 81, 98, 99, 100, 109	poliogaster, Accipiter	119, 120
paulus , Pragmothrips	156, 157, 158	Polydesmida: Xystodesmidae	183-188
paxila , Velia	113, 114	Polydesmus bifidus	183
peccans , Eurythrips	134, 135	corrugatus	183-188
peltatus , Terthrothrips	146, 147	crassicutis	183
penneri , Floridobolus	205, 206, 207	trimaculatus	183
percultus , Terthrothrips	154, 155	Polyphemothrips bursarius	174
pergandei , Essigella	72, 100, 107, 109	tibialis	174
perijana , Habia rubica	126, 127	ponderosa, Pinus	15, 73, 88, 90, 91, 97,
perijanus , Myiophobus flavicans	122, 123	102, 108	
perileucis , Acanthothrips	57, 58	Pragmothrips paulus	156, 157, 158
perplexus, Plesiothrips	54	Preeriella discors	179, 180
peruana, Monosa morphoeus	27	fumosa	178, 179
Schizoribautia	27	macilenta	177, 178
peruviana, Habia rubica	127	marginata	178
phana, Schizoribautia	28	minuta	177, 178
Phelps, William H., and William H. Phelps, Jr.		Priesnerothrips	175
Descriptions of four new Venezuelan birds, extensions of ranges to Venezuela and other notes	119-128	Primates	17-20
Philopteridae	195-200	prolatus , Karnyothrips	55, 56
Phragmothrips	155	Prospirobolus	67
achaetus	158, 159	Prosoptonaphothrips reticulatus, Anaphothrips	50
inuncatus	156, 157, 158	Pseudothrips interruptus	131
majusculus	155, 156	spadix	131
paulus	156, 157, 158	Pseudotsuga	70
		douglassi	107
		meziessii	107
		pubescens , Sericothrips	50
		pulchra, Fontaria	184
		pusillus , Eurythrips	135, 136
		pygmaea, Cebuella	17
		Q	
		quadrilineatus, Tachygonus	111
		quadrispinosa, Velia	116

- R
- radiata*, Pinus 78, 81, 85, 90
ramstadii, Narceus 205
reticulatus, Anaphothrips
 Prosopanaphothrips 50
 Sericothrips 50
Rhexenor annularis 65, 68
rhodinolaema, Habia rubica 127
Rhynchothrips 172
ribauti, Diplethmus 24
Ribauti fuhrmanni 26
rossi 26, 30
richmondii, Leucippus fallax 112
ricordi planirostris, Eleutherodactyla 212
 rogersi, Eleutherodactyla 212
robusta, Essigella 80, 103, 104, 105, 109
rogersi, Eleutherodactylus
 ricordi 212
rosalia, Simia 17
reseae, Habia rubica 127
rossi, Ribautia 26, 30
rubica affinis, Habia 127
 alfaroana, Habia 127
 amabilis, Habia 127
 bahiae, Habia 127
 coccinea, Habia 127
 confinis, Habia 127
 Habia rubica 127
 hesterna, Habia 127
 nelsoni, Habia 127
 perijana, Habia 126, 127
 peruviana, Habia 127
 rhodinolaema, Habia 127
 rubra, Habia 127
 roseae, Habia 127
 rubica, Habia 127
 rubricoides, Habia 127
 vinacea, Habia 127
rubiginosus meridensus, Piculus 122
 paraquensis, Piculus 122
 Piculus rubiginosus 121, 122
rubiginosus, Picus 121
rubiginosus rubiginosus, Piculus 121, 122
 rubra, Habia rubica 127
 rubricoides, Habia rubica 127
 rubrilata, Zinaria 185
rufescens, Glaucidium cuculoides 198
rufipectus, Leptopogon rufipectus 124
rufipectus, rufipectus, Leptopogon 124
rufipectus venezuelanus, Leptopogon 123, 124
 Russell, Louise M. iv
rustica, Cinara 14, 15
- S
- sabiniana*, Pinus 106
saltuarius, Orthothrips 165, 166
 Sanborn, Colin C. iv
 Schaldach, William J. iv
 Schanz, Viola S. iv
Schazothrips anadenus 133, 134
 Schendylidae 21
Schendylurus andesicola 21, 23, 30
 dentifer 21, 22, 23, 30
 pallidus 24
 pallidus lomanus 23, 24, 30
 69
Schizolachnus 14, 15
 curvispinosus 14, 15
Schizoribautia 26, 27
 carpisha 28, 29, 30
 centralis 27
 junina 28, 29
 peruana 27
Schizoribautia phana 28
 seydi 28
 titieacae 27
 schrunkii, Tangara 125
 schrunkii venezuelana, Tangara 125, 126
schuhi, Cinara 4, 5, 6, 8
 Schwartz, Albert
 A new species of Eleutherodactylus (Amphibia: Leptodactylidae) from Cuba 209-212
Scirtothrips brevipennis 49
 clivicola 49, 50
 longipennis 49
 taxodii 49
scopulorum, Pinus 73
secticornis, Anaphothrips 40
Selista forceps 65
 seminolus, Lasiurus 181
Sericothrips 49, 51, 52
 albus 51
 apateris 50
 catenatus 51, 52
 ephedrae 51
 desertorum 51, 52, 53
 chrysothamni 51
 cingulatus 50
 baileyi 53, 54
 moultoni 51
 pubescens 50
 reticulatus 50
 setosus 52
 trifasciatus 53
 setosus, *Sericothrips* 52
 setulosa, Cinara 11, 12, 16
 seydi, *Schizoribautia* 28
 shastensis, *Abies magnifica* 10, 11, 12
 siamensis, *Strigiphilus* 197, 200
 silvaticus, *Erksothrips* 166, 167
 Simia leonina 17, 18, 19
 nigrescens 17
 rosalia 17
 Simmons, Robert S. 67
 Sinobolus 67
 Smith, A. C.
 The Bredin-Smithsonian Caribbean Expedition iv
 Smith, Philip W., and M. Max Hensley
 The mud turtle, *Kino-sternon flavescens stejnegeri* Hartweg, in the United States 201-204
 Solanum 179
 sonatia, Cinara 9, 10, 11, 16
 spadix, *Pseudothrips* 131
 spinigerus, *Chicobolus* 205
 spinulosa, *Tenagopogon* 111
 Spirobolidae 205-208
 Spirobolus 61, 65, 67, 68
 bungii 61, 62, 63, 64, 67, 68
 ergo 62
 exquisitus 62
 joannisi 62, 67
 marginatus 62, 65
 olfersii 61
 walkerii 62, 67, 68
 stejnegeri, *Kinosternon flavescens* 201, 203
 stillifer, *Apoxythrips* 170
 Stine, Charles J. iv

<i>stolidus</i> , <i>Anous stolidus</i>	119	<i>tibialis</i> , <i>Polyphemothrips</i>	174
<i>stolidus stolidus</i> , <i>Anous</i>	119	<i>tinctorius</i> , <i>Narceus</i>	65, 66, 68
strenuus , <i>Garrulax cineraceus</i>	190, 191	tiptoni , Tanamarivea	37, 38
<i>Strigiphilus</i>	195-200	<i>titieacea</i> , <i>Schizoribautia</i>	27
<i>bramae</i>	195, 196, 200	<i>translens</i> , <i>Capito atratus</i>	121
<i>heterogenitalis</i>	198, 199, 200	<i>niger</i>	121
<i>ketupae</i>	196, 200	<i>Trichilia</i>	178, 180
<i>magrogenitalis</i>	197, 198, 199, 200	<i>trifasciatus</i> , <i>Sericothrips</i>	53
<i>siamensis</i>	197, 200	<i>Trips</i>	53
striolatus , <i>Eurythrips</i>	137, 138	<i>trifurca</i> , <i>Ephedra</i>	51
<i>strobos</i> , <i>Pinus</i>	77, 99, 100	<i>trimaculatus</i> , <i>Fontaria</i>	183
<i>styani</i> , <i>Garrulax</i>	189	<i>Polydesmus</i>	183
<i>Trochalopteron</i>	190, 191	<i>Trips panicus</i>	54
<i>subflavus</i> , <i>Echinothrips</i>	130	<i>trifasciatus</i>	53
subflavus <i>floridanus</i> , <i>Pipis-</i>		<i>Trochalopteron cinereiceps</i>	189, 190, 191
<i>tellus</i>	213	<i>ningpoense</i>	189, 190
subglaber , <i>Copiothrips</i>	161, 162	<i>styani</i>	190, 191
<i>superciliaris</i> , <i>Myiophobus</i>		<i>Trochilus fallax</i>	120
<i>flavicans</i>	123	Trypanothrips	172, 173
<i>swaini</i> , <i>Essigella</i>	74, 105, 106, 109	<i>coxalis</i>	173, 174
<i>swainsoni</i> , <i>Buteo</i>	120	<i>tuberculata</i> , <i>Pinus</i>	85, 86
symingtoni , <i>Eleutherodactylus</i>		<i>turalis</i> , <i>Huseyella</i>	117
.....	210, 211, 212		

T

<i>Tachygerris adamsoni</i>	193
<i>celocis</i>	193
<i>opacus</i>	193
<i>quadrilineatus</i>	193
<i>spinulosus</i>	193
Tachygonus	111, 193
<i>adamsoni</i>	111
<i>celocis</i>	111
<i>dulineatus</i>	111
<i>duolineatus</i>	111
<i>opacus</i>	111
<i>quadrilineatus</i>	111
<i>taeda</i> , <i>Pinus</i>	103
<i>Taeniolum</i>	24
<i>Tamarin</i>	17
<i>fuscicollis</i>	18
<i>Leontocebus lagontus</i>	18
<i>Leontocebus weddelli</i>	18
<i>nigricollis</i>	18
<i>nigrifrons nigrifrons</i>	18
Tanamarivea tiptoni	37, 38
<i>Tangara schrankii</i>	125
<i>Tangara schrankii venezue-</i>	
<i>lana</i>	125, 126
<i>Tanophilus</i>	24
<i>Taurus mexicanus</i>	31
<i>taxodii</i> , <i>Scirtothrips</i>	49
<i>Tenagogenus</i>	111
<i>adamsoni</i>	111
<i>spinulosa</i>	111
<i>tennesseensis</i> , <i>Fontaria</i>	184
<i>Terthrothrips</i>	155, 159
<i>balteatus</i>	152
<i>bicinctus</i>	147
<i>brunneus</i>	148, 149
<i>bullifer</i>	149, 150
<i>carens</i>	147
<i>fuscatus</i>	148
<i>hebes</i>	152, 153
<i>impolitus</i>	153, 154
<i>irretitus</i>	150, 151, 153
<i>luteolus</i>	151, 152
<i>peltatus</i>	146, 147
<i>percultus</i>	154, 155
<i>viduus</i>	147
<i>tesselatus</i> , <i>Hydriothrips</i>	180
<i>testudinatus</i> , <i>Emydocoris</i>	38
<i>Thalhibius</i>	25
<i>thurberi</i> , <i>Lepidium</i>	54
<i>Thysanoptera</i>	49-60, 129-180

U

Udeothrips vigilatus	131, 132
<i>ustulatus</i> , <i>Copithrips</i>	162, 163, 164

V

<i>valens</i> , <i>Eurythrips</i>	144
<i>varleyi</i> , <i>Eleutherodactylus</i>	212
<i>Velia, alia</i>	115, 116
<i>brachalis</i>	114
<i>nama</i>	114, 115
<i>paxilla</i>	113, 114
<i>quadrispinosa</i>	116
<i>venezuelana</i> , <i>Tangara</i>	
<i>schrankii</i>	125, 126
venezuelans , <i>Leptopogon</i>	
<i>rufipectus</i>	123, 124
<i>venezuelans</i> , <i>Myiophobus</i>	
<i>flavicus</i>	122, 123
<i>Verhoeff</i> , <i>Californibolus</i>	206
<i>vespiformes</i> , <i>Franklinothrips</i>	
<i>vicinus</i> , <i>Aglaocoris</i>	38, 39, 40
viduus , <i>Terthrothrips</i>	147
vigilatus , <i>Udeothrips</i>	132
<i>vinacea</i> , <i>Habia rubica</i>	127
<i>virginia</i> , <i>Alpheloria</i>	186, 187
<i>virginicus</i> , <i>Andropogon</i>	60
<i>virginiensis</i> , <i>Fontaria</i>	183, 184, 185,
	186, 187
<i>Jules</i>	184, 187

W

<i>walkeri</i> , <i>Spirobolus</i>	62, 67, 68
<i>weddelli</i> , <i>Tamarin Leonto-</i>	
<i>cebus</i>	18
<i>cebus</i>	iv
wilsoni , <i>Essigella</i>	74, 77, 96, 100, 106,
	107, 108
wisconsinensis , <i>Geomys bur-</i>	
<i>sarius</i>	33, 34
<i>woytkowski</i> , <i>Orthothrips</i>	164

X

xanthozonus , <i>Eurythrips</i>	138, 139
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Z

<i>zelonensis leschenaulti</i> ,	
<i>Ketupa</i>	196
<i>Zinaria rubrilata</i>	185
Zygethmus pantenus	24, 25, 30